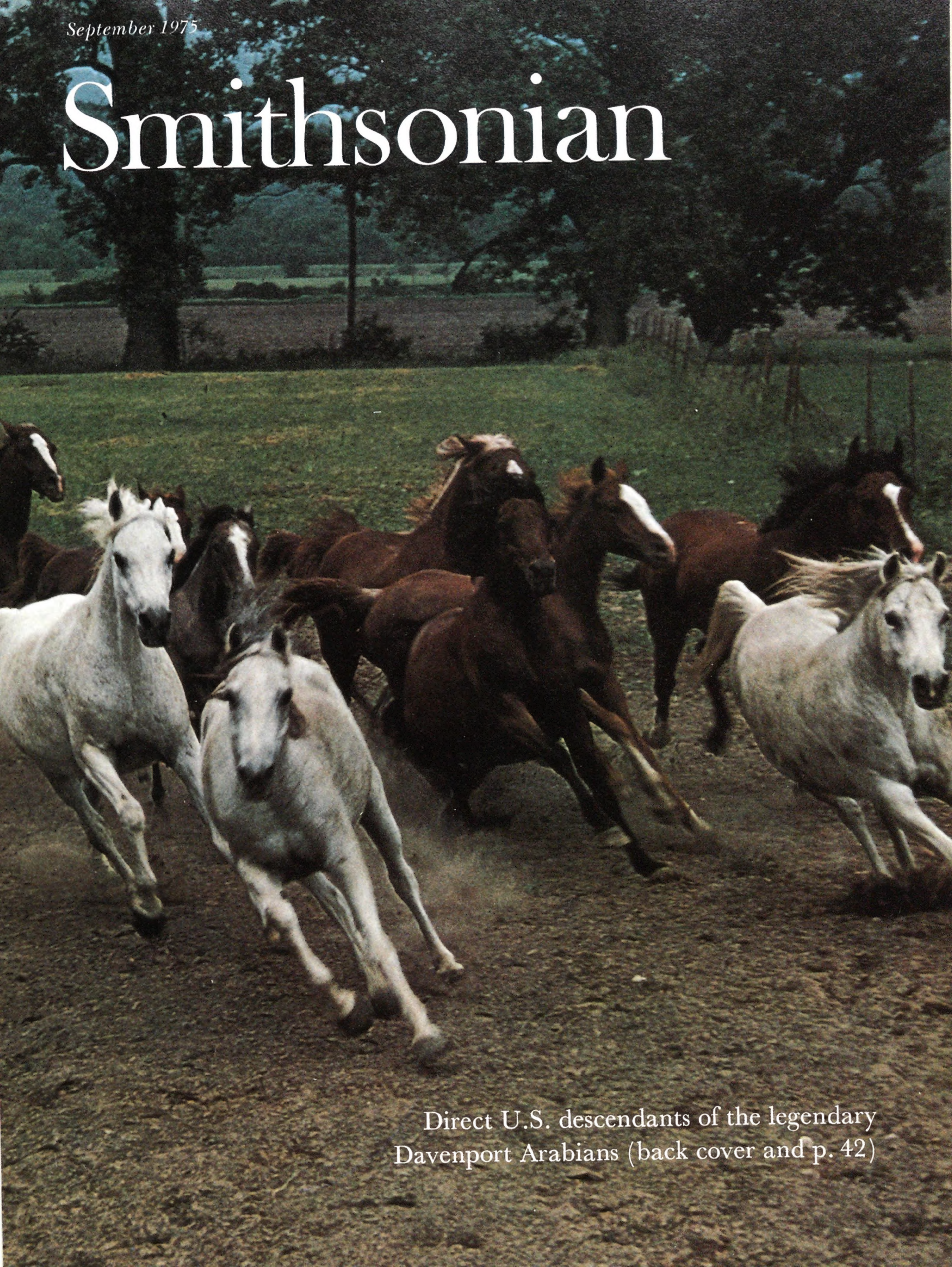
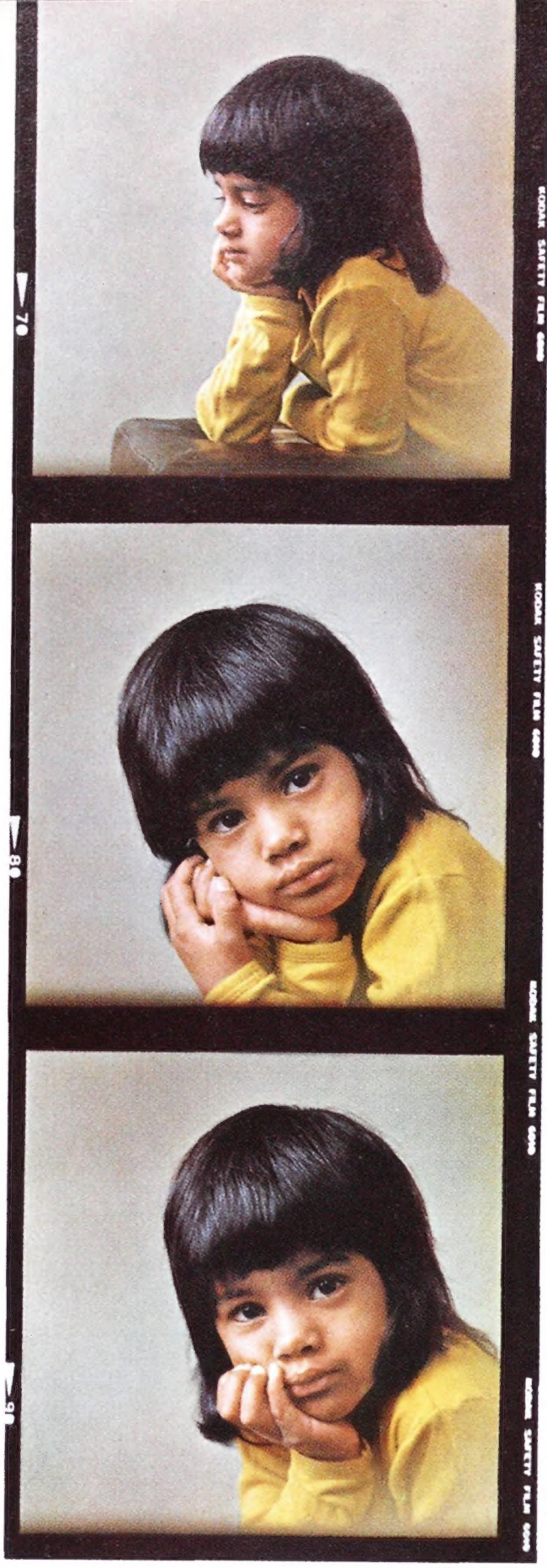
September 1975

Smithsonian

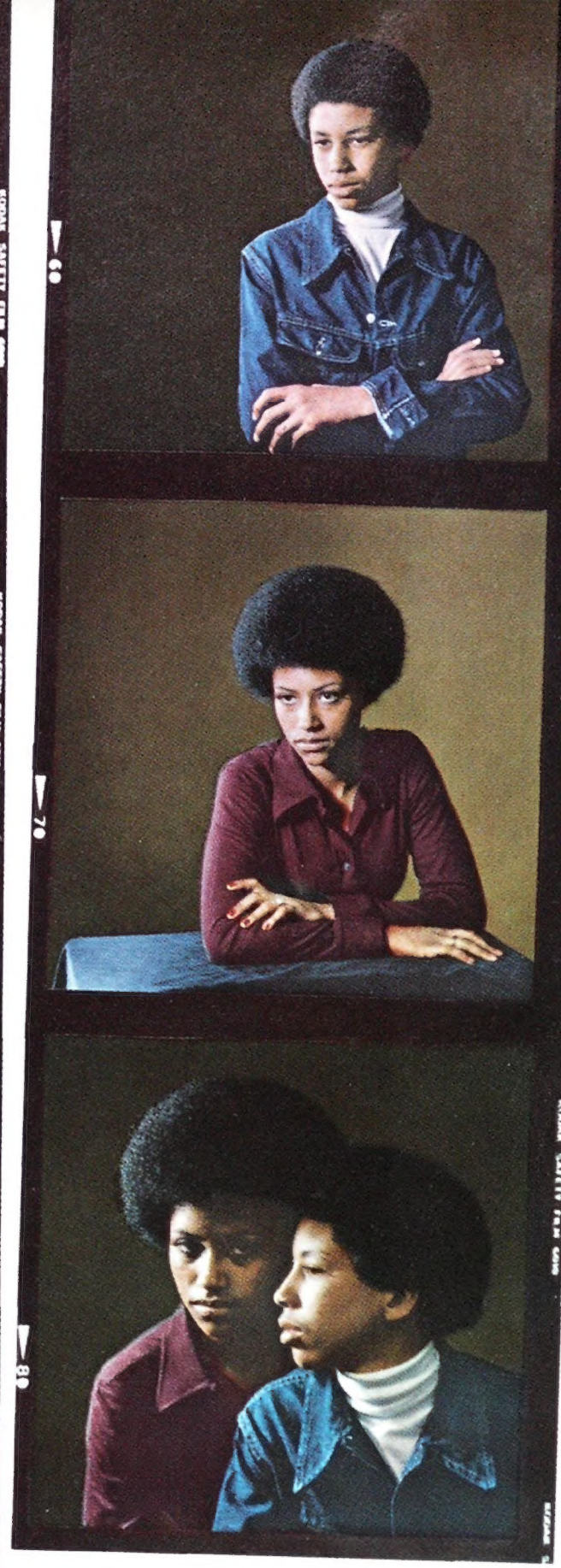


Direct U.S. descendants of the legendary
Davenport Arabians (back cover and p. 42)

A French lady, by Malaisy, Lille



A Swedish child, by Brorson, Malmö



Sister and brother, by Gilbert, Toronto

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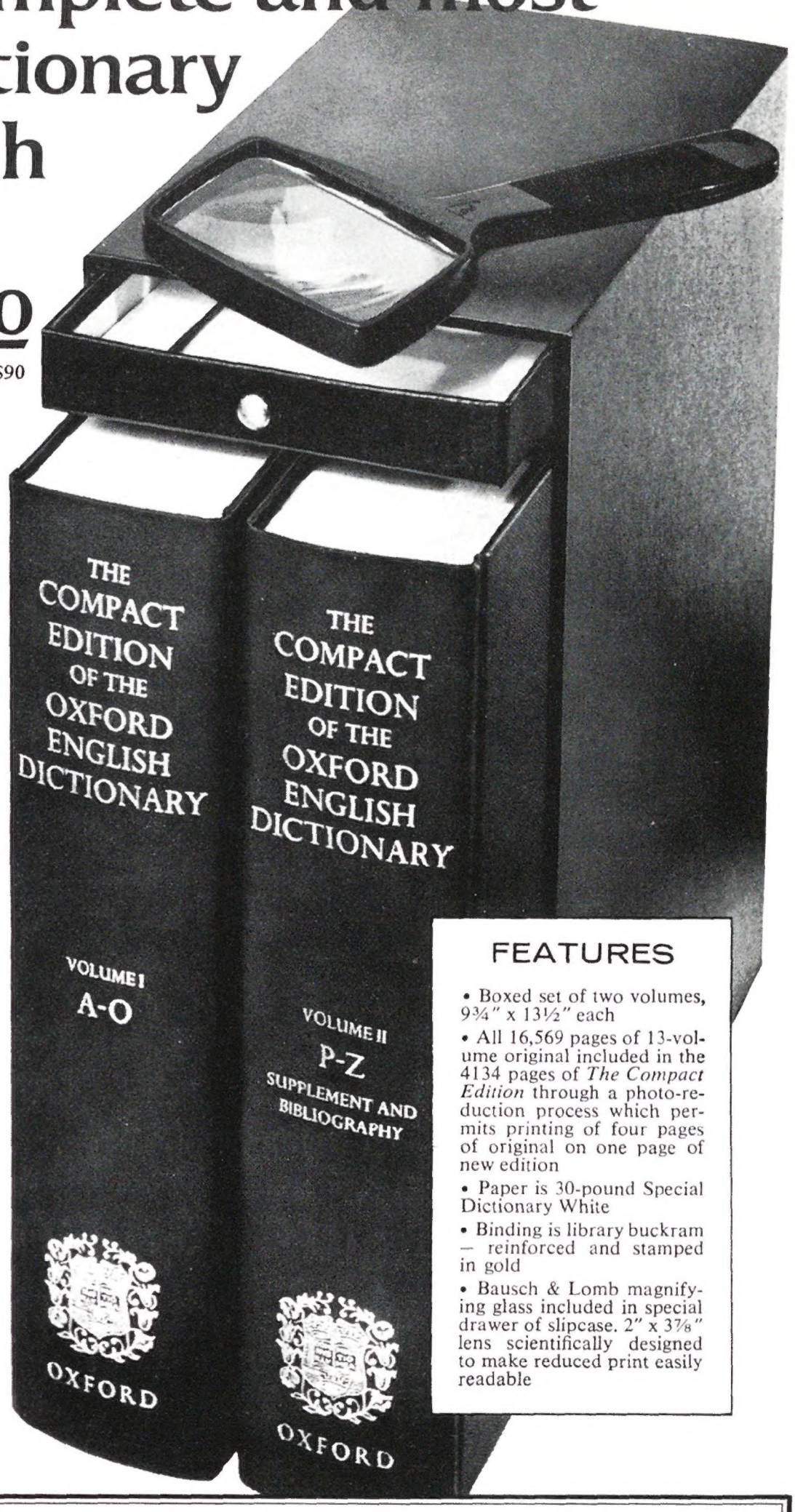

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September 1975

Smithsonian

Volume 6, Number 6

Table of Contents

COVER: Far from the desert, galloping mares are all direct descendants of Arabian horses brought to this country by Homer Davenport in 1906 (p. 42)
Photograph by A. Y. Owen

6 The view from the castle: Secretary Ripley's advice to museums is that money begets power, but the power clings to the dispensers of funds

8 Phenomena, comment and notes: Continuing trouble with ozone, in orbit and around the galaxy, some nice parasites and the language of nature

16 Letters to the Editor

24 Around the Mall and beyond by Edwards Park

32 The right kind of preservation, on a creative scale, can save our disappearing downtowns
By Peirce Lewis

42 Famous cartoonist Homer Davenport's Arabian horses remain a pure breed today
By Anthony Amaral

50 Dry riverbeds on Mars suggest that the sun's temperature has fluctuated over millions of years
By William K. Hartmann

56 Homeowners and conservationists are trying to stop a dam in Kentucky's Red River Gorge
By Alton Marsh

66 "What we did on our vacation": Some students tell of singing and dancing their way through Romania
By David Nevin and students of Dwight-Englewood High School, photographs by Ralph Crane

78 When fire destroyed the nation's collection of patent models—Mudge's smut machine among them—artists restored thousands of them on paper
By Peggy Thomson

84 Maine and eastern Canada are trying bacterial warfare against the spruce budworm, an enemy of the forests
By John P. Wiley jr.

90 Artist Thomas Cole went into the wilds to develop an American tradition of landscape painting
By Marcia Clark

98 The battle to keep China's 800 million people fed is being waged in the communes, but it's hard work
By Henry and Muffie Brandon

106 Book reviews

120 Additional reading

122 September events at the Smithsonian

127 Smithsonian tours

128 There may be flea circuses—but in *Monahans*?
By H. Allen Smith

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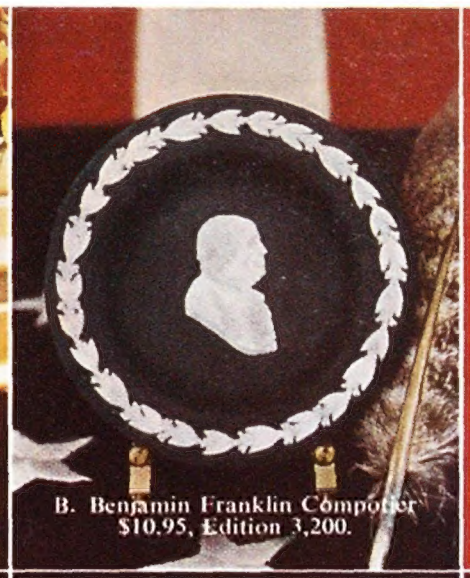

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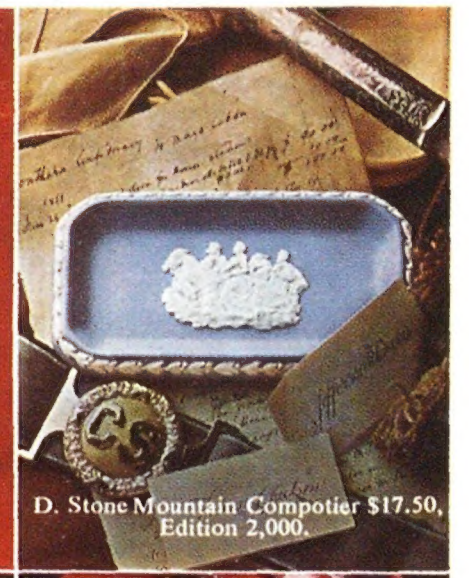

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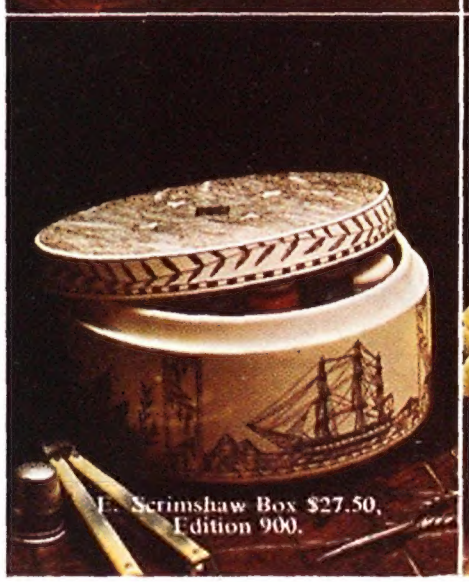

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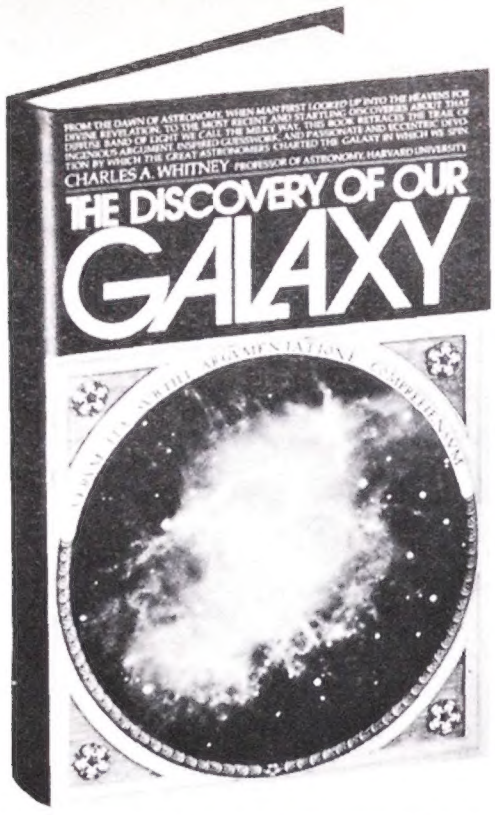

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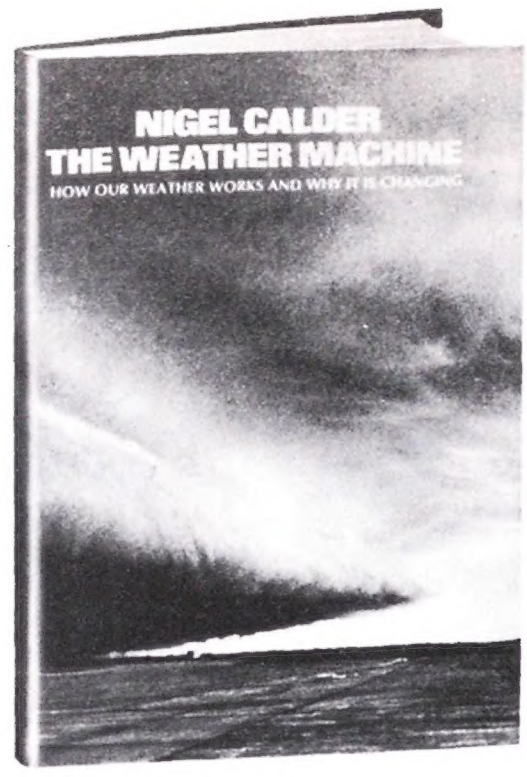

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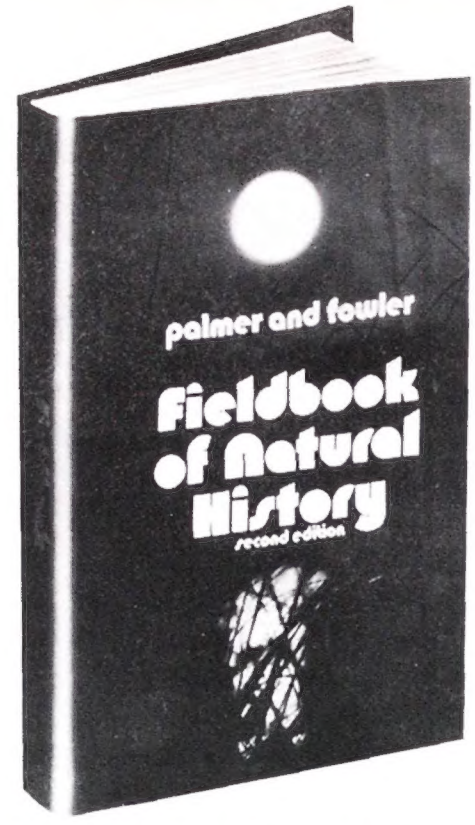

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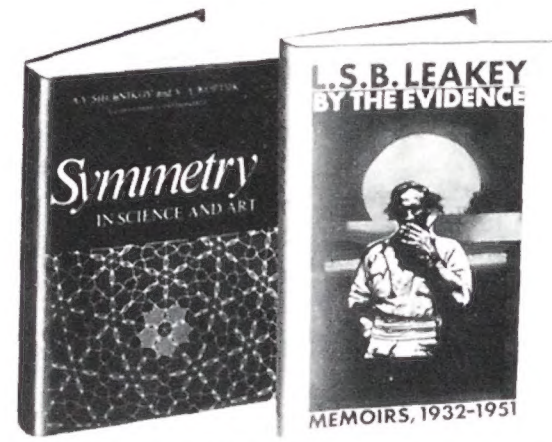

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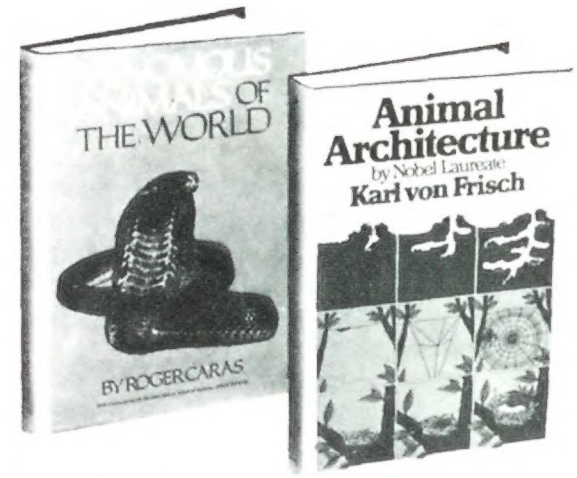

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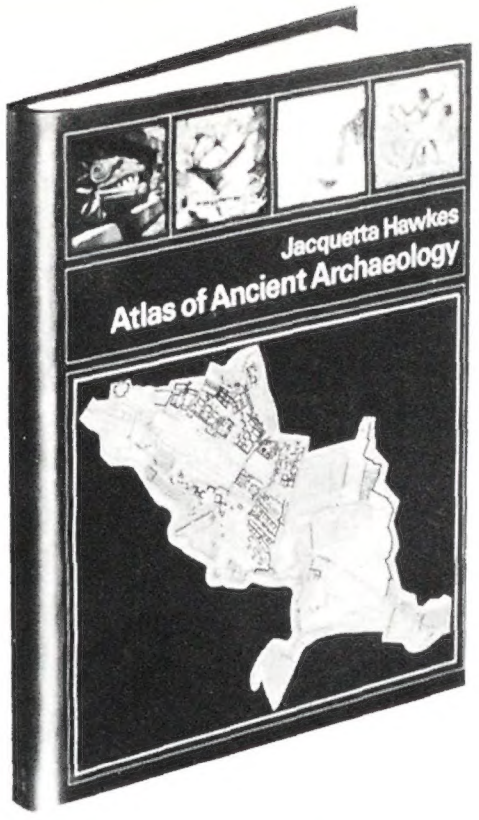

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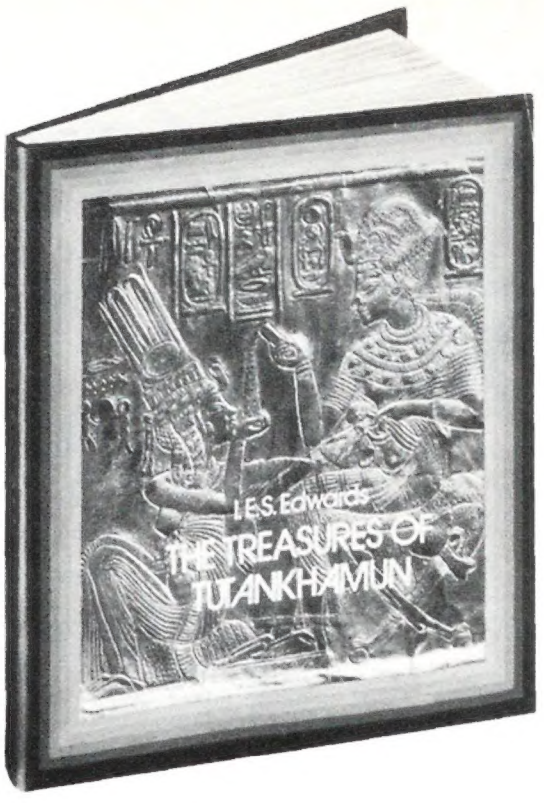

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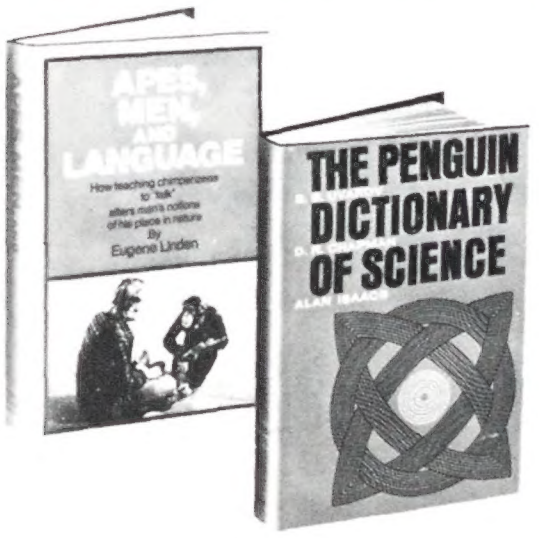
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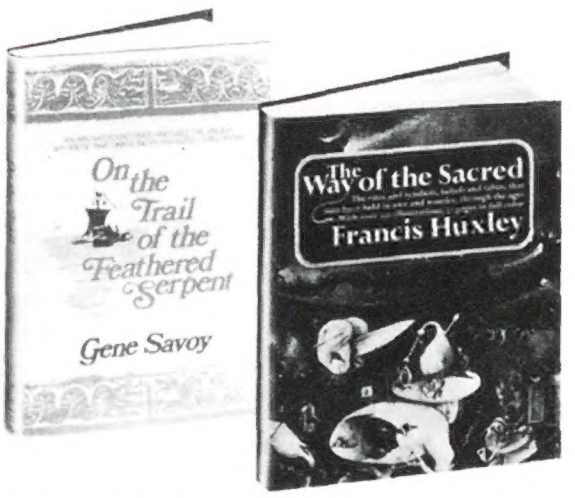

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The view from the castle

In their search for support as educational institutions, museums should realize that the source of funds can influence the message

Education is a subject of universal speculation. Is it better when coordinated (and thus paid for) by the state, or when it originates spontaneously because someone wishes to teach and others to learn? In the United States, education is known to be good—like cleanliness—and the more of it the better so as to produce good achievers who can eventually revel in the good life. At least that is one popular notion of education—a materialistic one which, in their hearts, many people would find fitted the American dream.

Museums are now more conscious than they used to be of their role in our culture. Far from being dumps of things that nobody wants, museums will inevitably achieve a higher and higher priority as repositories of the truths of the past.

In order to achieve the status and recognition they need in order to obtain support, museums assert that they are educational institutions just as libraries are, and that they need to be recognized as "good." Thus, museums are seeking support now from the government, whether through arts councils, the National Endowments, the National Science Foundation, or the Department of Health, Education and Welfare, whose budget (as a result of our belief in education, our trust in medical science and its wizardry to cure us all, and our faith in the benefits of welfare) is the largest. It is so large, in fact, that a few crumbs from the table falling into museum laps would hardly be missed.

However, as Montaigne said, "the most universal quality is diversity." Museums today are great tools of education because they are open, unstructured and freewheeling. But if they are to arouse interest by exhibits, they must be varied and diverse. Exhibits show objects, whether of nature or of Man's creation, but their purpose as well is to teach us something. The Smithsonian's first two major Bicentennial exhibits offer a good example because they are as diverse as could be. Consider the exhibit at the Museum of History and Technology called "We the People." It has 6,000 artifacts on view, a panorama of American creativity of *objects*, a kaleidoscope whose message is overwhelming without labels.

Contrast that with "The Dye is Now Cast" at the National Portrait Gallery, a brilliantly labeled historical document charting the onset of the American Revolution. It is an exhibit of portraits, with artifacts as accessories, and with a catalog which can be used as a resource book in American history courses. (Catalogs of both exhibits are available from the Smithsonian Institution Press.) What could be more diverse than these two exhibits produced in two buildings of the same institution? And this is the way it ought to be, for diversity will enliven and excite the mind.

Let those of us responsible for museum policies and their future as educational institutions mark well the evolution of the educational apparatus in this country, where the common acceptance and vast federal and state support has cheapened the net effect through the dead hand of regimentation and pedantry. Money begets power, but the power remains with the dispensers of the money. Museums would do well to measure, every step of the way, their independence against their eventual dependence on government funds.

S. Dillon Ripley

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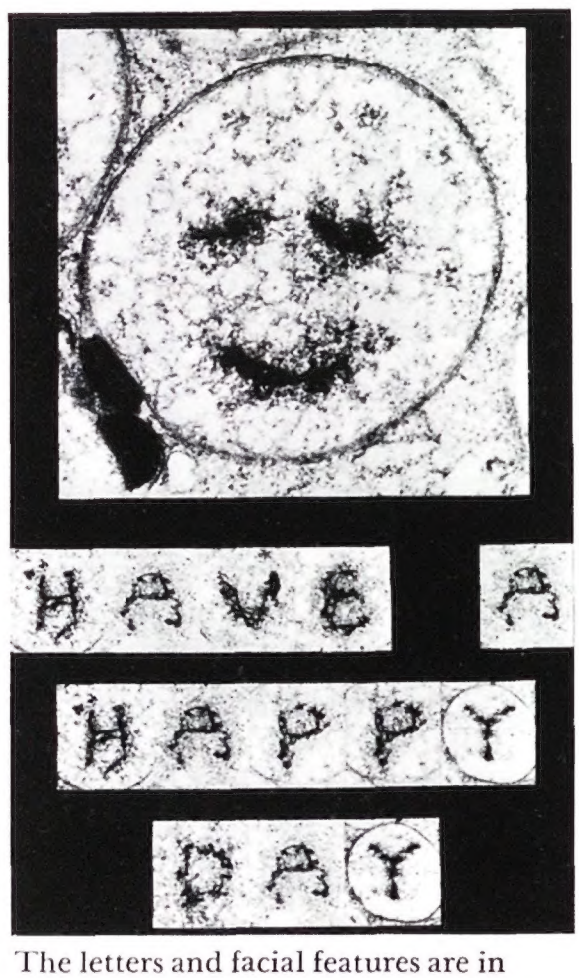
Phenomena, comment and notes

The continuing concern about ozone, in orbit round the galaxy, nice parasites and the language of nature

Philosophers tell us that everywhere we look in nature there is a message if we can read it. Some people take this homily quite literally, finding the letters of the alphabet in the patterns of moth wings (see SMITHSONIAN, January 1975). The quest has been advanced, one might say by several orders of magnitude, into the message of the genetic code. And, it seems to be a pleasant message.



The letters and facial features are in fact the genetic material of bacteroids.

A. Smithson Craig (apparently no relation to the Smithsonian's founder) of the Department of Scientific and Industrial Research in New Zealand peered at the dark squiggles of genetic material of a bunch of bacteroids dwelling in a single cell of a peanut root nodule. The results of this nuclear anagram can be seen in the composite electron micrograph at the bottom of this page.

Pop goes a wives' tale

There are a number of peculiar habits one can pick up in a lifetime such as slurping coffee or creating loud clacks by folding over a piece of chewing gum to create an air bubble in it and then crushing it abruptly with the molars. All of these have a largely unexplained physical satisfaction for the perpetrator but are irritating to polite society. At least one such habit, however, is also considered to be hazardous: that is, cracking your knuckles. Children who discover the joys of making their knuckles pop (there are several techniques: the forward fold-over, the sidewise swivel, the dramatic eight-finger fold-back) are told by scandalized mothers that it will lead, as the night follows the day, to enlarged knuckles and, ultimately, arthritis.

Sorry, Mom. Somebody has looked into the matter, namely Dr. Robert L. Swezey of UCLA. His son cracks his knuckles and his son's grandmother disapproves. According to *Medical World News* (Volume 16, Number 15), Dr. Swezey studied the knuckles of several people in a home for the aged. Only one out of 15 confessed knuckle-crackers had "metacarpophalangeal degenerative joint disease." Furthermore, "five of 12 non-knuckle-cracking women had degenerative joint disease, against only one of 11 females classified as knuckle-popping positive."

The research has had its critics, including one arthritis authority, and presumably young Mr. Swezey's grandmother is unconvinced.

Godzilla the pest

A favorite theme of Grade Z science fiction movies is the return, by one means or another, of prehistoric creatures to terrorize the scene. Well, it is a possibility—and we may well bring it about in the course of mining the ocean bottoms for manganese nodules. The National Oce-

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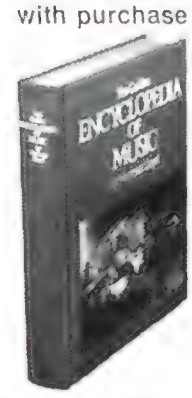

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anic and Atmospheric Administration has been doing a little mining out in the Pacific to determine the ecological effects of this about-to-boom industry. It seems that when you bring up manganese nodules from the bottom, you also bring up sediments. And, according to *New Scientist* (Volume 66, Number 948), NOAA found long dormant spores of microscopic plants in the sediment which bloomed when exposed to light at the surface.

The project leader, Dr. Oswald A. Roels, warns of the possibility that deep ocean mining might bring back to life ancient organisms which are otherwise extinct and which might become serious ocean pests since their natural enemies are now extinct.

Nice parasite

Romantics have a hard time rationalizing parasites into their scheme of benevolent nature. What earthly good is a tick? But wait a minute. There are some times when parasitism is good for you—especially if you are a young spider of the species *Achaearanea tepidariorum*. Such spiderlings tend to be parasitized by a wasp which lays its eggs among the spider's eggs. As both develop, the young wasps eat up some of the spiderlings just at the development stage in their lives (called the second instar) when the little spiders are about to soar away like balloons, which happens to be what young spiders do to escape home.

Dr. Carlos E. Valerio of the University of Costa Rica reports in *The American Naturalist* (Volume 109, Number 966) that most spiderlings die before getting airborne. But when the wasp larvae start barging around, they stimulate the stronger spiderlings to eat their siblings: Thus fortified, more of them (about five percent as opposed to two percent for parasite-free spiderlings) are likely to survive. So in evolutionary terms this instance of parasitism is of value: Romantics who can stomach cannibalism may now relax.

Cosmic seasons

Now that everyone is accustomed to thinking of the earth as a great space ship, it is time to think a bit bigger. The entire solar system is like a fleet of space ships orbiting the center of the Milky Way Galaxy every 500 million years. That means that about every 250 million years

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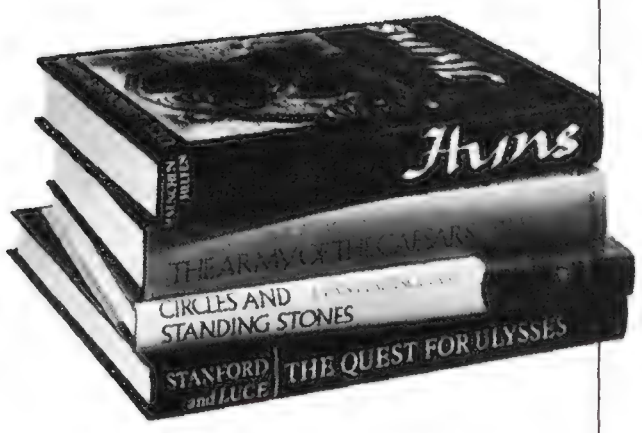

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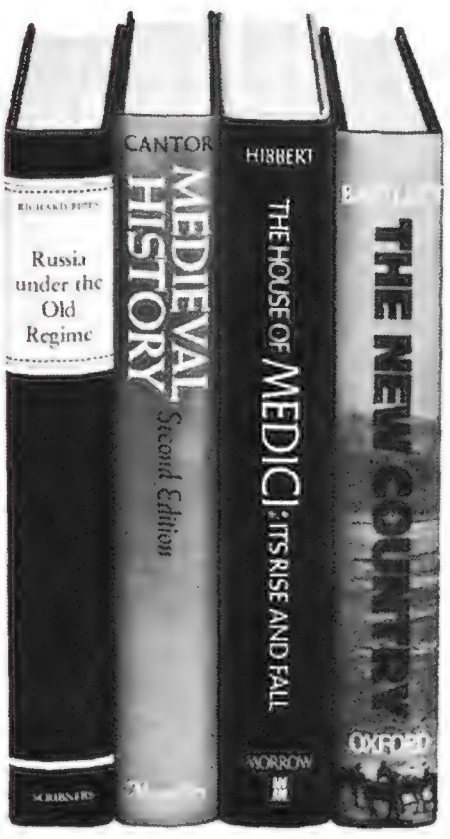

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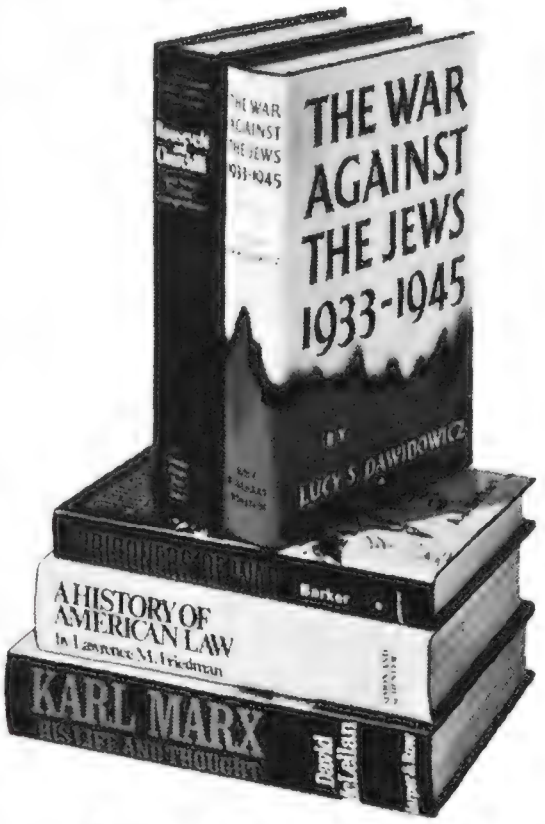

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the solar system passes through one of the galaxy's two spiral arms. Now, 250 million years is about the same interval geologists have found between the occurrence of ice ages on the Earth.

A British astronomer, W. H. McCrea of Sussex University, has figured out a plausible theory which makes all this seem like more than a coincidence. Along the bright spiral arms of the galaxy are dark lanes, the result of shock waves as clouds of dust and gas run into the arms. When *we* run into one of these dark lanes, the sun accretes dust, warming up its surface temperature slightly. The effect of this, paradoxically, is to create cloud cover of a sort that causes the Earth to lose heat, resulting in an ice age. (Another ice-age theory appears on pp. 50-55.)

The solar system has just passed through such a dark lane and has entered the Orion arm of the galaxy. "Just," in the terms used here, means 10,000 years ago, and that is also when the last ice age came to an end.

As reported in *Nature* (Volume 225, Number 5505), Professor McCrea goes on to suggest that comets were formed from clouds of gas and dust being compressed as they ran into the shock wave. Indeed, the entire solar system and other stars could have been produced by the same general mechanism.

In any event, if the theory is right, we should have seasonable weather for the next 250 million years.

Oh, that ozone

A properly informed citizenry, we are often told, will make right judgments even on technical matters. That may well be true. The difficulty is figuring out the proper information in the first place, much more communicating it. Consider the ongoing donnybrook over ozone (see SMITHSONIAN, June 1975). Science periodicals are full of ozone these days.

One sees reports that a high level U.S. task force involving some 14 agencies, including the Council on Environmental Quality, has recommended a ban on the use of fluorocarbon propellants in aerosol spray cans, provided that a National Academy of Sciences report due next April does not find evidence that the current theory is wrong. (The current theory is that chlorine, separated from the inert fluorocarbon gases by ultraviolet radiation in the stratosphere, will break up the

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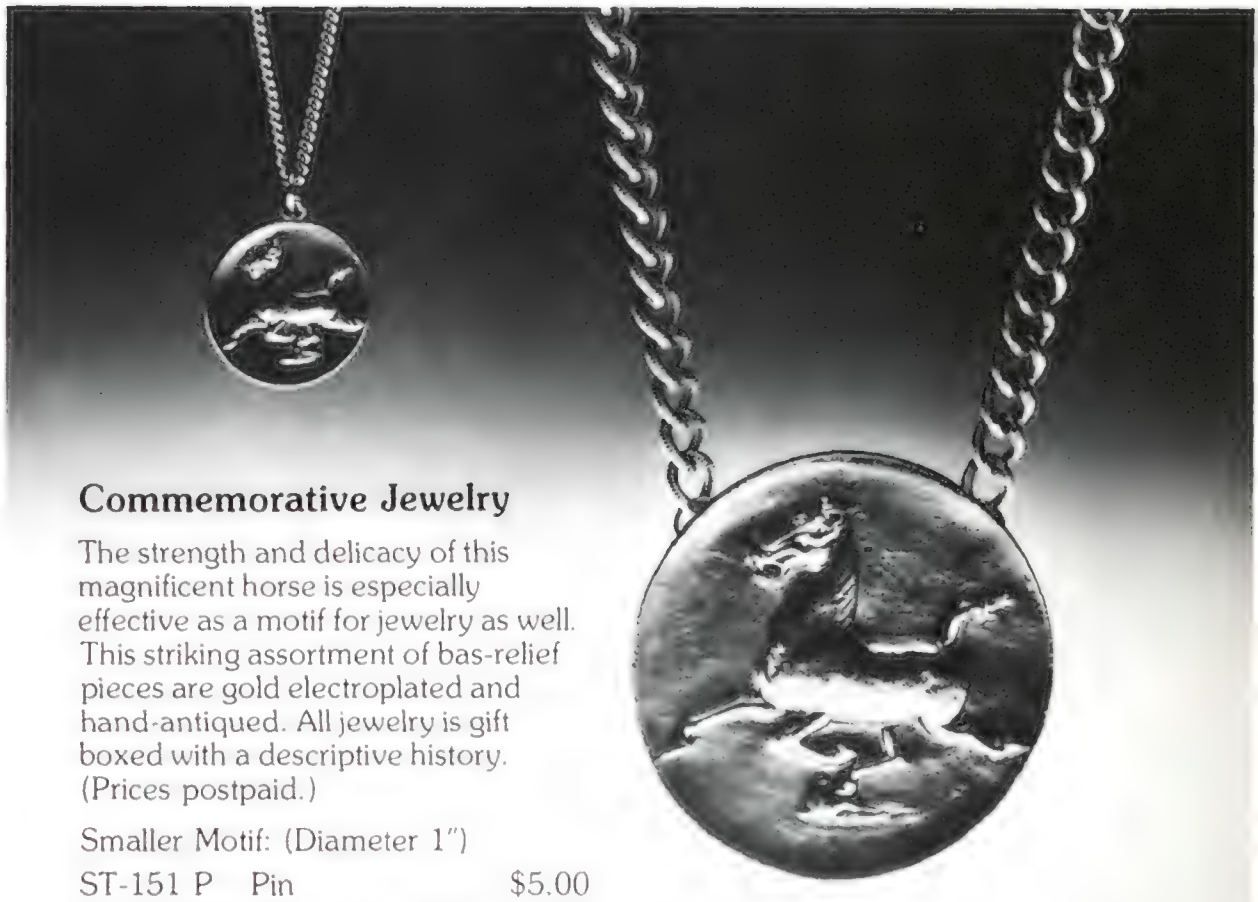

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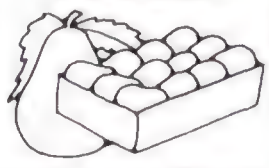

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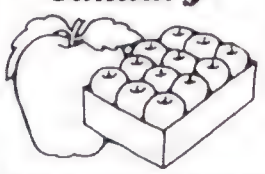

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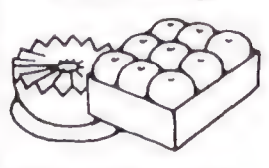

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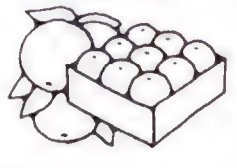

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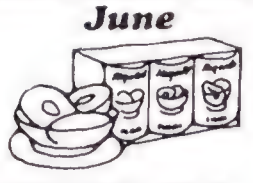

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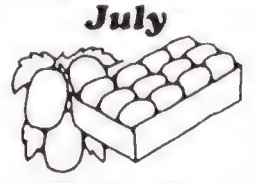
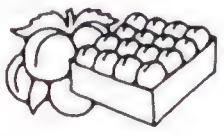
July



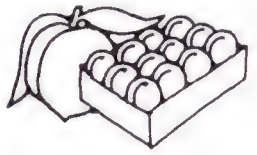
GIANT KIWI BERRIES
Wonderful new fruit from New Zealand. Delicate strawberry-banana-watermelon flavor
Rich in vitamin C, too
Net weight 2-1/2 lbs

August



EXOTIC NECTARINES
Plum peachy. Big and blushing. *A sure-fire summer sensation . . look good on the figure, too.* Net weight 5 lbs

September

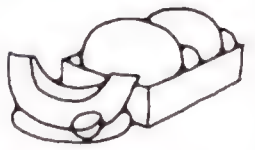


OREGOLD PEACHES
Family and friends'll never *forget these huge Oregon* beauties. We rush 'em harvest fresh. Net weight 6 lbs

October

ALPHONSE LAVALLE GRAPES
Big, velvety black Belgian *hothouse type. Make store-*bought grapes look like birdshot! Net weight 4 lbs

November



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ozone layer, leading to more UV on Earth and therefore more skin cancer, not to mention other unfortunate effects.)

One learns that Oregon, the state that banned throwaway bottles and cans, has banned the sale of aerosol products propelled by fluorocarbon, and that several other state legislatures as well as the United States Congress have similar bills before them.

One hears that the "fillings" of aerosols and pressurized products were a mere 2.72 billion units in 1974, down 6.6 per cent from the 2.90 billion units of 1973. And though most manufacturers brand the Oregon law as benighted and the ozone scare as the culprit, one major producer of household waxes (informed by heaven knows who) announces that no longer will any of its products use the nasty propellants—any of its products, that is, sold in the United States. It will still use fluorocarbons in products for the British market.

Then one hears one of the scientists who first noted the presence of fluorocarbons in the atmosphere saying that there is little evidence that higher levels of UV radiation would cause skin cancer. An English scientist, Richard Scorer of London's Imperial College, agrees.

Furthermore, he claims that there is more ozone now, not less, than a few years ago; that everybody has been using too simple-minded a model of the atmosphere upon which to hang their predictions; and that the entire ozone scare is groundless.

It is all enough to give us informed citizens a headache, whatever else the effects of aerosols are, or aren't.

JAMES K. PAGE JR.

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Letters to the Editor

Prairies

Dear Sir: Dennis Farney's article in the July issue on restoring the prairies brings to mind stories that my grandfather tells of how he rode in a horse-drawn sled over the prairies when he first came to North Dakota in the early years of this century. The runners skimmed over the lush grass as easily as they did over snow and ice. It's sad to realize that we have allowed all but the most inaccessible areas of our virgin prairies to be destroyed.
Jeffrey L. Rotering
Amidon, North Dakota

Dear Sir: We in the Soil Conservation Service who have been deeply involved since the Dust Bowl days with efforts to revegetate unsuitable cropland are gratified by such articles as Mr. Farney's. The evolution of techniques and materials for restoring prairies has progressed from the simple controversy of natives versus exotics to "mixing up the gene pools."

Early attempts at grassland restoration were based on using the know-how and materials available. As research and experience progressed, locally adapted native plants became the goal for use in reseeding.

Frequently, people establish native vegetation on sites in areas where there are no closely located relic areas. Then, too, many ecotypes used away from their point of origin flower at a different time from the local ecotypes, so the possibility of mixing of the gene base may be minimal. However, it is a problem that we are aware of and do everything possible to prevent.

As a result of the Soil Conservation Service's work with plant materials, more and more native plants have become available where none were before. This is also true of selected native wildflowers.

Two million acres have been seeded back to grass in the plains, by far the majority of it to native mixtures.
Robert E. Williams
Director, Plant Sciences Division
Soil Conservation Service, USDA
Washington, D.C.

Sailing in the Arctic

Dear Sir: We admired the ersatz Viking hat Skipper Watson sported on his Arctic venture, but we wondered if we would recognize him in the office.
Mr. & Mrs. Joseph Lee
New York City

Mr. Watson is no "Hagar the Horrible" of the comic strip. Ed.

Dear Sir: In Mr. Watson's beautifully illustrated article, there is one statement that should be amended. He mentions that Leif Ericsson's landfall at L'Anse aux Meadows, Newfoundland, was a site "discovered by the Norwegian archaeologist Helge Ingstad. . . ."

My husband is an archaeologist whose specialty is the Canadian Arctic. He has visited the site and we are personal friends of Mr. Ingstad. We are also great admirers of his wife, Anne Stine Ingstad, and it is she, the trained archaeologist of the two, who should be given shared credit for the discovery, and for its excavation.
Mrs. Elmer Harp jr.
Hanover, New Hampshire

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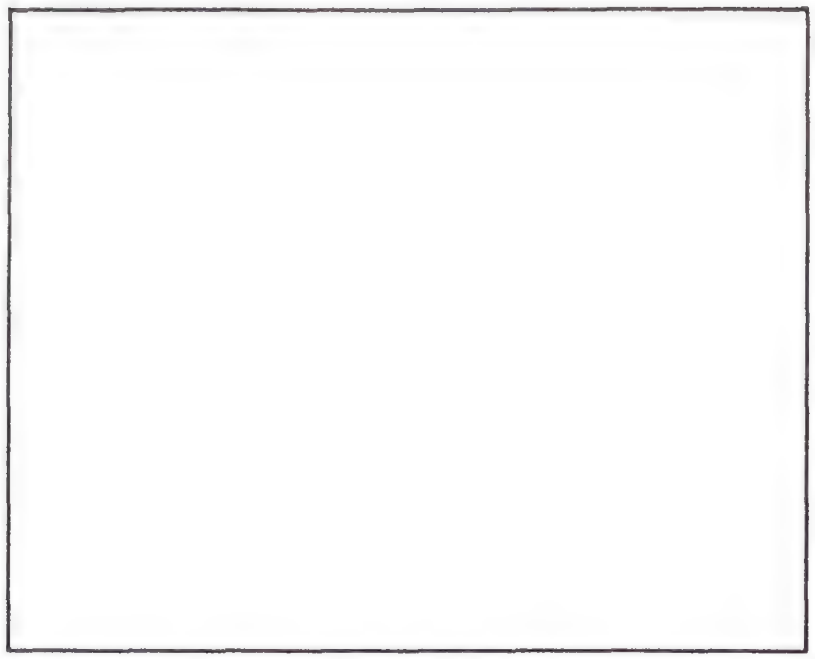

Imagine the evening sun turning the facade of the Palace of the Masks to burning gold.

We could show you a picture of this incredible building carved of stone by the Mayans some thirteen hundred years ago.

But to find the special meaning the Mayan genius has for you, you need to see their work for yourself. And that is our point. No one can tell you what you will feel on a vacation. They can only promise you the freedom to find out for yourself. That is our promise. No other Caribbean cruise offers our remarkable freedom of choice to determine your own sense of pleasure. Whether aboard our 100th Anniversary Celebration ship or ashore, you will be free to discover your own unique definition of total relaxation.

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The mts Daphne is registered in Greece.

Dear Sir: If Mr. Watson ever sailed his *Palawan* to the south Pacific, he would have a problem finding the ship's namesake. Palawan island is part of the Philippine Islands. It is in the western Pacific.
Lysander E. Canlas
West New York, New Jersey

Declaration of Independence

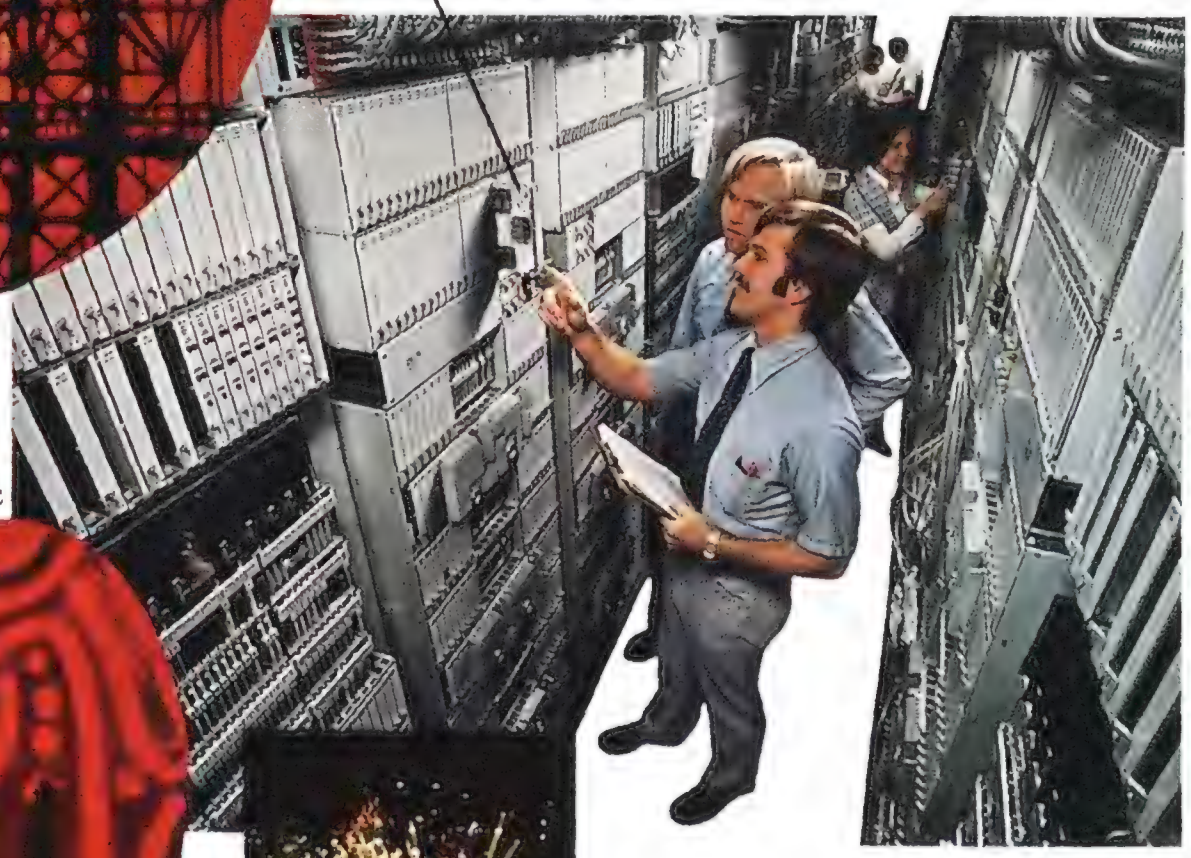
Dear Sir: In Richard B. Morris' article on how the Declaration of Independence was received abroad two centuries ago, I believe the portrait of John Wilkes you reproduced was by Hogarth [see below].
John D. Smith
Chicago, Illinois
Mr. Smith is correct. The portrait was drawn from life by Hogarth and published in 1763. According to Engravings of Hogarth, *edited by Seas Shesgreen, Hogarth retaliated against Wilkes for his attack on the artist's character by depicting him with "a leer on his face. His mouth is twisted in mockery, and the pupils of his eyes are disturbingly crossed. His wig is fashioned to suggest . . . demonic horns."* Ed.

Dear Sir: I cannot resist the temptation to tease you a bit about the horrendous boo-boo in the caption under the picture of George III. Like most Americans, I was raised to believe that old George was about as stupid a man as ever lived, but to assume that he ever said "the dye is cast"—no: this is too much. Surely you meant "the die is cast."
F. B. Page
Kernville, California
For Mr. Page and the many others who have questioned the spelling, "The Dye is Now Cast" was a direct quote from George III in a letter to Lord North, September 11, 1774. Ed.

There are still some things Americans know how to do best.

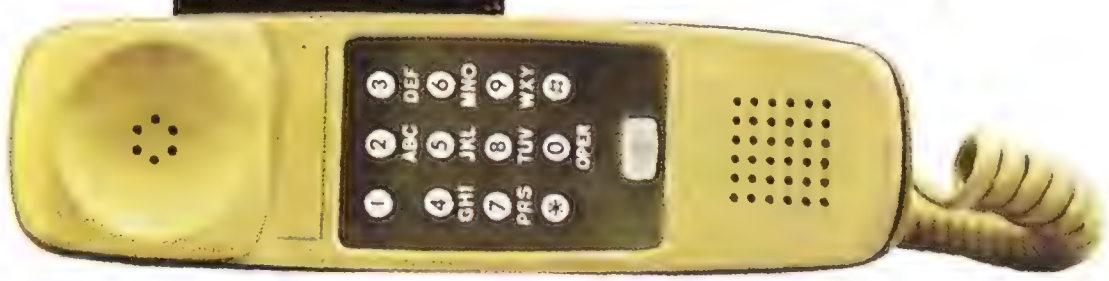
1. One of them is building our phone system. The people of Western Electric and Bell Labs have developed ways to put even more phone conversations on the microwave network—three times more in the last decade—to meet the growing needs of a growing nation.

2. To prepare for those needs, people like Western Electric engineer Chris Zitny and Bell Labs engineer Robert Jackson have helped create electronic switching systems that can route over 350,000 phone calls an hour.



3. At the same time, Bell System people are working on innovative ideas like magnetic bubble "memories" that will help route your call by storing millions of bits of information in space no larger than a business card.

4. Our planning for the future may someday result in your call being carried on a laser beam through a thin thread of glass.



Making a phone call may be a small thing to you.

But to us it's a big job.

It takes a delicately balanced network of some million million parts for you to reach the one phone you want out of 140 million.

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We're part of the Bell System.
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Your sunglasses could be tiring you out. If they aren't really sunglasses.

Your eyes devour an amazingly large share of your physical energy. If they are tormented by badly made or unsuitable lenses, extra energy will be drained. You'll tire a little faster—not just your eyes but all of you—and you won't understand why.

All this simply because you were never told what sunglasses are and are not. For example, great as they are for some purposes, glasses with light-tinted lenses or light shades of photochromic lenses—that change from light to dark—aren't really sunglasses. Real sunglasses are for eye comfort and protection. Their lenses should filter out infrared and ultraviolet rays. Each lens must have the same density and pass no more than 30% of the light. And they should be of prescription quality—free of distortion and waves.

All B & L Ray-Ban SunGlasses meet these requirements. And have since the 1930's when they were developed for our fighter pilots.

If you don't wear sunglasses meeting these standards your eyes will have to work harder. You need energy. Don't waste it with the wrong sunglasses. Write for our free booklet "Sunglasses and Your Eyes", Bausch & Lomb, Dept. 502, Rochester, New York 14602.

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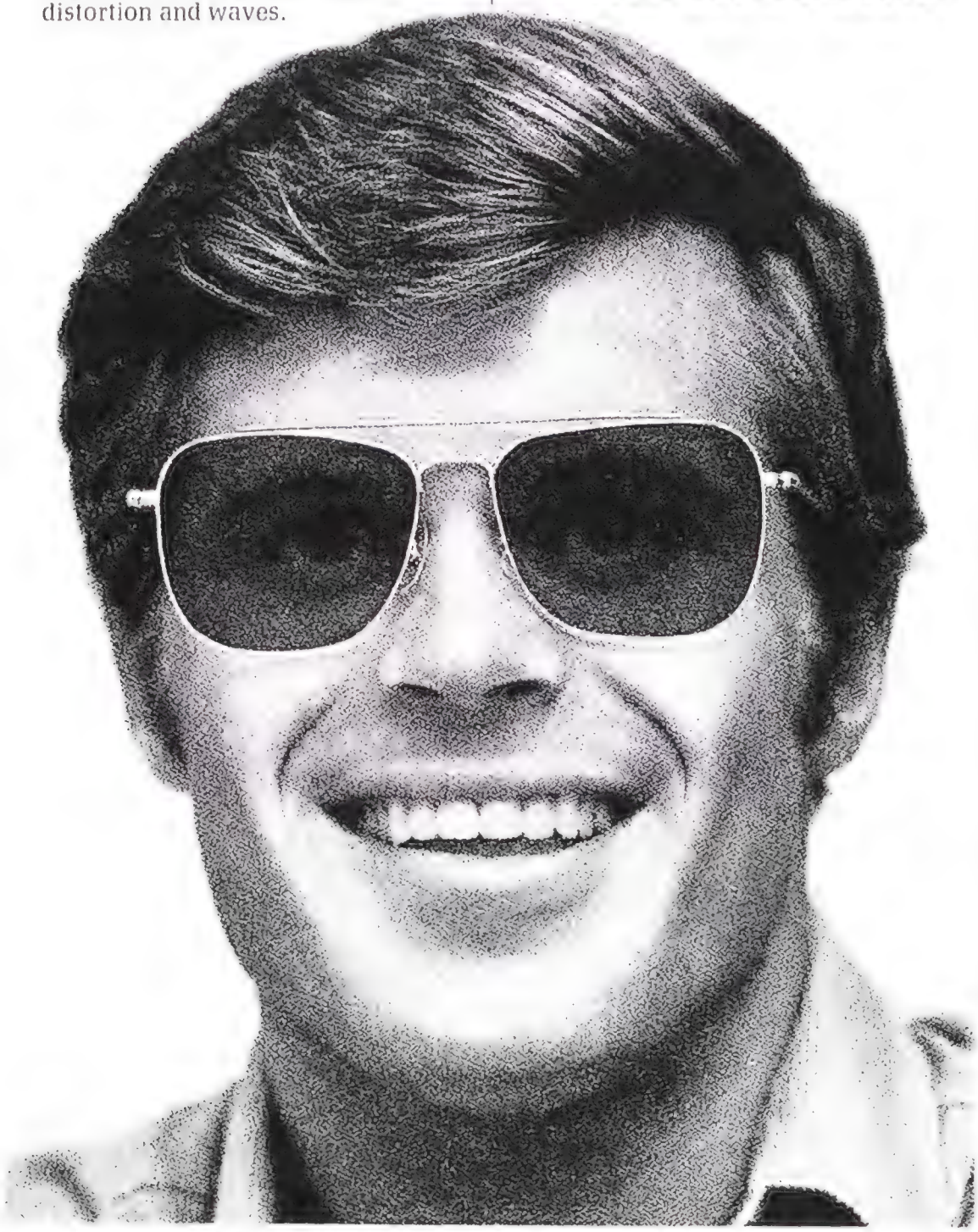


Shown: "Caravan" one of the popular Ray-Ban styles. Others from $10

Phenomena, comment and notes

Dear Sir: You quote Mr. Edward J. Saller [July issue] to the effect that 1939 automobiles would pass 1975 air pollution standards. I must protest that this is a myth, although apparently quite popular among vintage car enthusiasts.

Generally, old model cars utilized engines with relatively low compression ratios (5-6 versus today's 8) and characteristically these vehicles produce relatively high emissions of hydrocarbons (HC) and carbon monoxide (CO). Mr. Saller may have been misled by the fact that older cars typically have produced relatively low emission levels of oxides of nitrogen (NOx). In any event, in order to "pass 1975 air pollution standards," vehicles must be within the limits for *all* three controlled pollutants.

While vintage cars do have their charms (I own a 1914 model myself), there is no question that 1975-76 cars, whatever the make, are more efficient in both fuel economy and pollution control.

Michael W. R. Davis
North American Automotive Operations
Ford Motor Company
Dearborn, Michigan

Dear Sir: Your comments seem too brief for discussing a controversy such as the Indian leaders' remarks on the Bicentennial. Its incompleteness begs for answers to the questions it raises.

Although many feel the desires of AIM are basic human rights, many find them symptomatic of greed; others are turned off by AIM's unwillingness to compromise, or because desires are cited as demands. After I read your article, newspapers reported the killing of two FBI agents on an Indian reservation and a bomb explosion at a Bureau of Indian Affairs office. These violent tactics further reduce the chance for harmony.

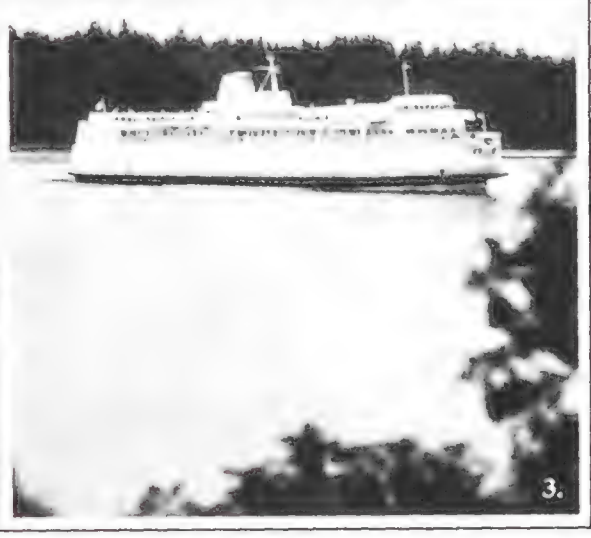
A solution *is* needed. I believe that a respectable committee of both Indians and non-Indians could establish a clearinghouse through which citizens could assist Indians, financially and otherwise.

Keith Benner
Pensacola, Florida

Dear Sir: Your comment on how some Indians view the Bicentennial celebration calls for a correction on your spelling. Downtown Syracuse used to be inundated annually by Onondaga Creek,

British Columbia, Canada

These pictures are just a sample of what is waiting for you in British Columbia. 1. Fort Steele, once a gold rush boom town, growing old gracefully in the East Kootenays. 2. Downtown Vancouver as it looks from Kitsilano Beach (great fish and chips at the beach). 3. A fast fleet of ferries links the British Columbia mainland to Vancouver Island and the Gulf Islands. 4. One of the intriguing shops to be found throughout the Province—browse for treasures till teatime. For a lot more information write: British Columbia Department of Travel Industry, 1019 Wharf Street, Victoria, British Columbia V8W 2Z2. Or call your local travel agent.



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flowing into Onondaga salt flats and Onondaga Lake in Onondaga County. Yet, we mispronounced it as badly as you misspelled it ("Onandaga"). We said "On-a-dawga" instead of "Onondahga."
Paul H. Stone
Yonkers, New York

Getting blitzed by Blitzen

Dear Sir: Patrick Ryan's column was very amusing, except for some of his advice on how to avoid being struck by lightning. Lightning current does not stop where it hits the ground; it may spread over a larger area or continue in a line along the surface for tens of meters. If it does so, the ground becomes electrified —easily thousands or tens of thousands of volts between points one meter apart.

Thus, do not lie flat! Not even on a rubber raincoat, which is easily pierced by voltages of that kind. Instead, crouch down, your feet close together and your head bent—or, if this is too difficult, kneel down, knees and feet close together and bend down, but do not touch any other point of the ground. And stay away from the next person by two meters or more—lightning may jump from one to the next.
Hans Dolezalek
Alexandria, Virginia
Mr. Dolezalek offers useful advice. If, however, a person is in a wide-open space, he should lie down to avoid being the tallest object and a candidate for being struck by lightning. Ed.

Delaware Water Gap

Dear Sir: Michael Olmert's charming article reminds me that contrary to the rule of geographic law (as quoted by my father) the rivers of Pennsylvania cleave *through* the mountains, not along the valleys between them.
Fred DeP. Rothermel
Reading, Pennsylvania

August cover

Dear Sir: Isn't your August cover of Pittsburgh wrong-side-to?
Ian Forbes
Pittsburgh, Pennsylvania
Yes, the image was reversed during the editing and production processes. The issue was all printed before the error was discovered. For the correct view, hold the cover before a mirror. Ed.

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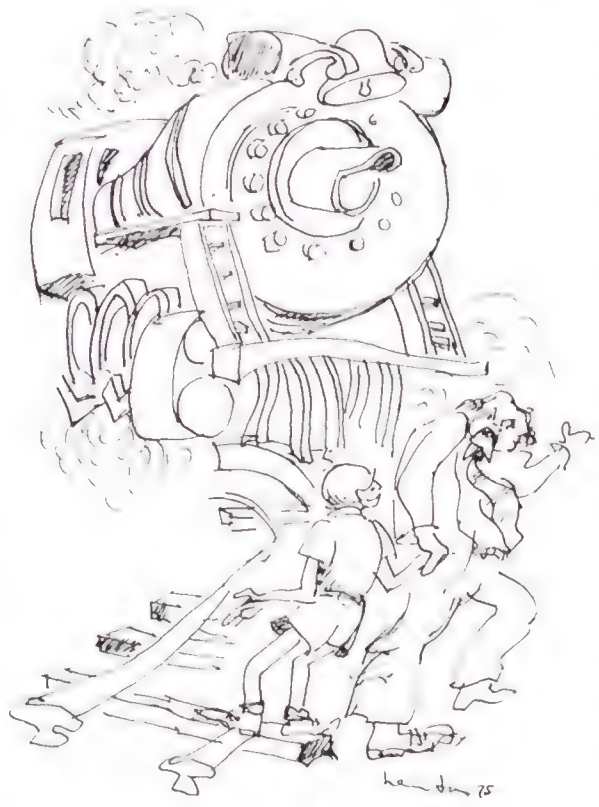
The last time I stopped to pay my respects to the Southern Railway steam locomotive on the ground floor of the Museum of History and Technology, the sound system was working to perfection. I say this, not because it constitutes news, but because there are times when it doesn't work, and then the whole staggering impact of that great green engine is diluted. Oh, it's always a great sight, a 50-year-old Pacific-type engine, sitting there on its little stretch of track, its boiler gleaming, its piston rods shining with purpose, its chrome steel bright. But it doesn't come alive until you hear it.

The locomotive arrived at its present station three years before the building opened to the public. It came through a hole in the wall which was later sealed by an enormous piece of plate glass. Standing there, it sighs and pants and then starts up with a great, long-drawn chuff, and picks up the tempo gradually as the pistons throw their muscle into the six drive wheels. You can hear the creak of the rails as it passes, and the groan of the couplings. And hearing it, you can almost feel the heat from the firebox and see the great beast sway and stream its plumes of steam as it thunders along.



The day I was there a seven-year-old boy moved away from his parents and stood out in the middle of the track, legs sturdily spread, staring up at the towering front of the 280-ton engine while it wheezily rested at the depot. Then, the sound track came on strong with those first eruptive chugs, and you could almost see the steam boil out from around the cylinders and the billows leap up from the smokestack and the sand trickle out onto the track as the drivers slipped a bit before getting a bite on the rails.

It was all too authentic for Dad, who obviously remembered steam engines from when *he* was a small boy. His arm shot out from the crowd of tourists, grabbed hold of Junior, out there on the track, and snatched him out of the way.

Authenticity is the name of the game when it comes to Smithsonian exhibits. And sometimes achieving it is a headache. In Hall 23 of the Museum of Natural History, an exhibit entitled "South America: Continent and Cultures" will open next month. But not without its quota of heart-stopping near-disasters, all for the sake of authenticity.

The hall depicts four topographical areas of South America: the arid western coastland, the rain forest, the Andes and the pampas. In each of these, you'll get a look at the anthropology, natural history, agriculture, geology and geography, history and life-style of the region. It will be a beautiful exhibit, a credit to Dr. Clifford Evans and Dr. Geoffrey Conrad, who run it and did much of the research and collecting. But the pampas region gave trouble.

The exhibit depicts some Indians on horseback, swinging bolas at rheas as they scamper across the plain. The scene is portrayed on the backdrop of the exhibit and then carried on in the exhibit itself—a plastic Indian on a stuffed horse, whirling a bola (real) as he approaches a stuffed rhea in the midst of a scamper. And underfoot, the pampas grass.

But what a time they have had, over at

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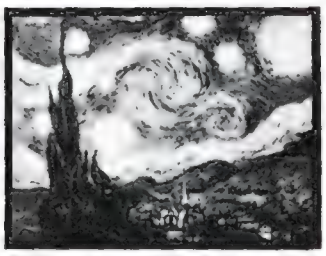

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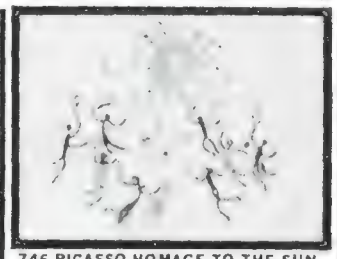

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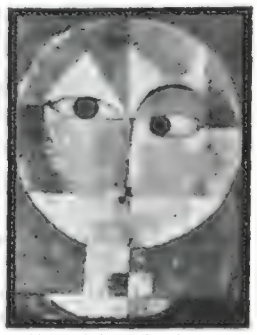

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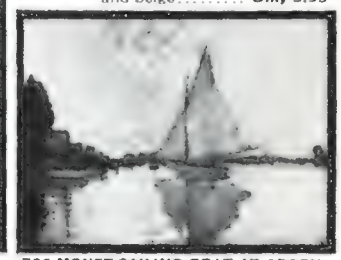

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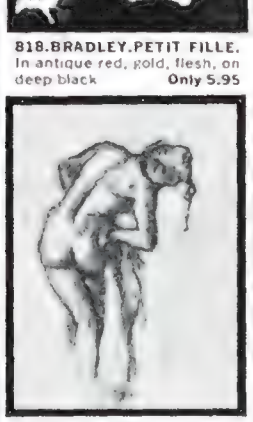

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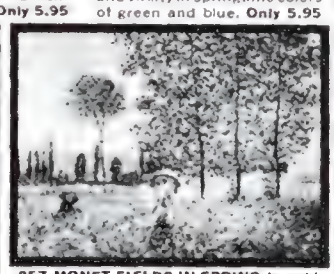

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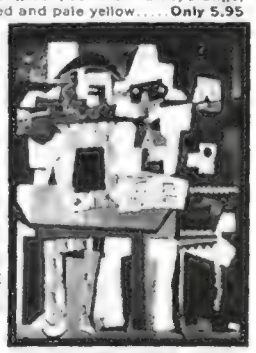

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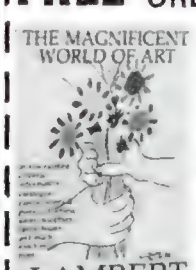

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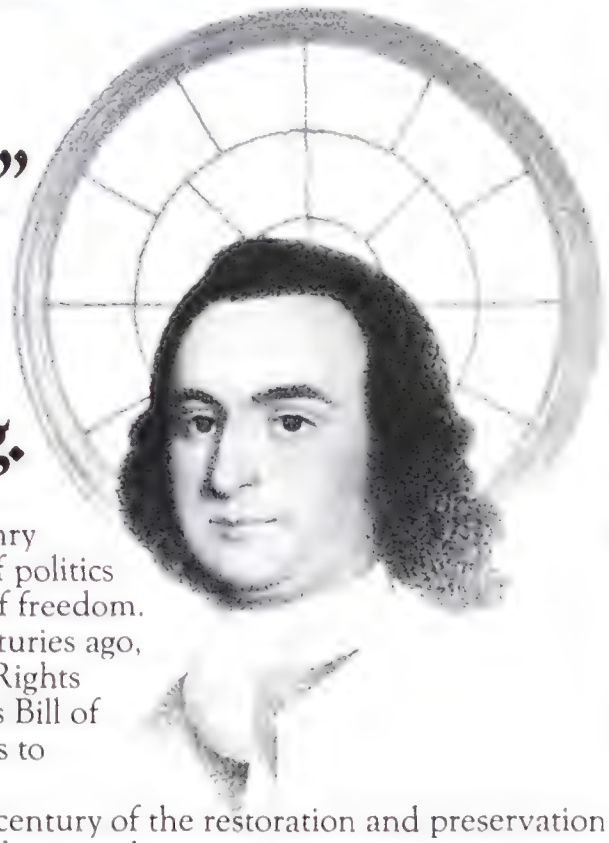
Freedom went "publick" from the Capitol in Williamsburg.



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Hall 23, getting hold of that grass. They wrote down to Buenos Aires last December, says Gene Behlen, exhibit programmer, to a botanist who knew someone who was going to Bariloche, several hundred miles in the interior—in Patagonia, actually. Plenty of authentic pampas grass down there, apparently. Only trouble was the contact went off to Europe, instead of Patagonia—for which, possibly, he cannot be blamed—so another attempt had to be made.

In March, at last, the grass was collected—two cubic meters, or if you prefer, two bales of hay. The two boxes were addressed to Dr. Thomas Soderstrom, Curator of Research in the Smithsonian's Department of Botany, American Embassy, Buenos Aires. That address immediately caused trouble, because, you see, Dr. Soderstrom and his office are located in Washington, D.C., not in Buenos Aires.

The boxes of grass (that sounds bad, I know, but really that's what they were) showed up at the American Embassy in Buenos Aires. An official there—a minor one, it is to be hoped—glanced at them, noted with dismay the expenses involved in shipping them, could find no Dr. Soderstrom to pass the buck to, and fired them off to the limbo of an Argentinean warehouse. I suspect that's an even less optimistic fate than a sentence to an Argentinean slammer.

Fortunately the bales were sprung, and returned to the embassy for another go at it. But the same official reacted the same way and back they went to the clanger. It took a while before the U.S. Foreign Service figured out just what was going on here, anyway, and then they got in touch with the Smithsonian, up in Washington.

"Gee, we're sorry about that mix-up with those boxes of—ah—grass, but we'll get them right on a ship for you."

The Smithsonian's artist had already painted a whole mess of pampas grass on his backdrop and he wanted to look at the real thing to see if he'd come close. So the Smithsonian told the Foreign Service, please don't put the boxes on a ship, put them on a plane.

"But, golly, a *plane*. That's *expensive*."

We know, said the Simthsonian. But we've got this artist who's painted pampas without ever having seen it, and we really do want those boxes here right away.

"But gosh, on a *plane*?"

The Smithsonian pointed out that the artist was leaving to get started on an-

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other project and we did indeed need the boxes now—via air.

"Well, okay, but you'll have to wait a bit before we get the boxes to the airport. There's this national holiday coming up, and then the weekend. . . ."

It turns out that Behlen had a bet going with Evans over whose shipment would arrive first, Behlen's grass or Evans'

items for an Andean marketplace—fruits, vegetables and trinkets. Evans won. He got a shipment: a little box about 10 inches on a side. It was only a token of what Evans had ordered, but it came. And it was enough to win the bet because, as we slide inevitably into our deadline, Behlen has yet to receive a single blade of pampas grass. Don't worry. When the hall opens October 11, it will all, somehow, be there.

There is plenty of grass, and a growth of trees that begins to look like a rain forest, at the Smithsonian's Chesapeake Bay Center for Environmental Studies. The center occupies 2,600 acres of old farmland encompassing the drainage into Maryland's Rhode River, a short and scenic tributary to Chesapeake Bay. This chunk of land allows the Smithsonian to carry on an estuarine study that is hard to match in the nation. The elements of shore life, the geography of the land and the makeup of the feeder streams are all carefully tracked down here to see what effects they have on the Bay itself.

The center carries on many other kinds of research, mostly concerned with this vast watershed. And in the last couple of years the people there have been developing an education program which allows students to get in on the act. Late in June, a fine new building was dedicated which will allow about 15 students to live at the center as well as serve as a class and conference room.

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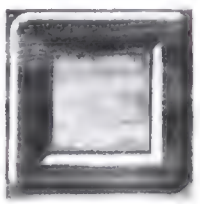

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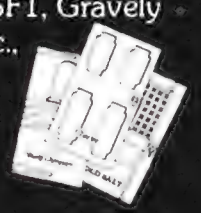

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FURNITURE

Don Wilhelm, Administration Officer for the center, and John Falk, in charge of the education program, led me through this modern schoolhouse, and I realized, wistfully, that if this sort of facility had been available to me in my late teens—an attractive building set amid the towering trees of the watershed, with a friendly quacking of ducks and geese in the waterfowl compound just down the hill, and with a brightly painted recreation room where a person can build a decent peanut butter and jelly sandwich, and with neat little bedrooms, and with *girls* working right along with you—why, given all that, I might have made something of my life as a microbiologist or a marine zoologist or something.

There have been 11 students in the dormitory this summer, working at things like summer ecology and other science studies. One project is to help young children see what's going on in their own local environments. The OBIS project is part of a national program that the center is facilitating in this area. The initials stand for Outdoor Biology Instructional Strategies and it's designed to show kids of 10 to 15 that science is with them all the time, that biology is also learned outside the classroom. The center has also been hosting teacher-led field trips. When students go on a field trip, they are taken in hand by a resident expert while the class teacher usually goofs off. At the center, the teacher keeps on teaching.

"It puts them right on the line," as Don Wilhelm says.

Not all young people are satisfied with plunging through the marshes beside Chesapeake Bay in search of hydras. Susan Mohill, Janice Mronga, Heather Potempa and Teri Washner of Chicago have got it in their heads that they want to get at the bottom of the Loch Ness mystery, and no nonsense. After seeing last Spring's Smithsonian TV special about monsters, this group—the Loch Ness Monster Club, aged from nine to 11, wrote to the Institution with the entire scenario for laying the ghost of "Nessie" once and for all:

"I had a couple of ideas on how to get to Scotland," wrote Susan. "We could have the government send us by plane or we could by a submarine and go in that, or we could get somebody to drive us to New York and take a boat."

The method of discovering Nessie's secret gets more complex: "We will make a trail of dead fish and plants and have a submarine follow that. Then Janice will be signaling to me where Nessie is. Susan and Heather will go down underwater and Susan will shoot Nessie with a tranqulizer and Heather will have a net and put it around the monster. . . . Teri will be at shore to make sure everything goes right. . . ."

I don't know Teri, but she's got a very provocative idea.

Physically a long way from the Loch Ness Monster, both in aspect and environment, is dear old Barney Studio House, an Institution acquisition in the midst of Embassy Row on Massachusetts Avenue in Washington. It was turned over to us 15 years ago by the Barney sisters, Natalie Clifford Barney and Laura Dreyfus-Barney, who had built a reputation as art connoisseurs in the late 19th and early 20th centuries, collecting, among other things, some fine paintings of the French Symbolist movement and turn-of-the-century American works.

The Smithsonian used some of the elegant old rooms to make up a suite for an artist in residence. This was later used to house visiting dignitaries and new executives of the Institution who had not yet lined up a house in the Washington area. One of my own colleagues on the magazine lived this way and celebrated his good fortune by throwing a small cocktail party for the rest of the staff. I remember wandering downstairs from his suite, to probe great drawing rooms, haunted with past glory, all darkly Edwardian and mysterious in the dim lights.

Well, anyway, the dear old place has been condemned by the fire department for faulty wiring. It withstood demonstrations at the Embassy of Vietnam, across the way, and the demands of VIP dinner parties and the sloppy housekeeping of my colleague and all those ghosts in the funky old rooms—but got shot down by some faulty insulation. Pity.

After renovation, Barney Studio House will continue hosting receptions and seminars concerned with the arts but, in the meantime, there was a group of girls working there for the Institution's Traveling Exhibition Service who have had to move. They call themselves "traveling lady exhibitionists."

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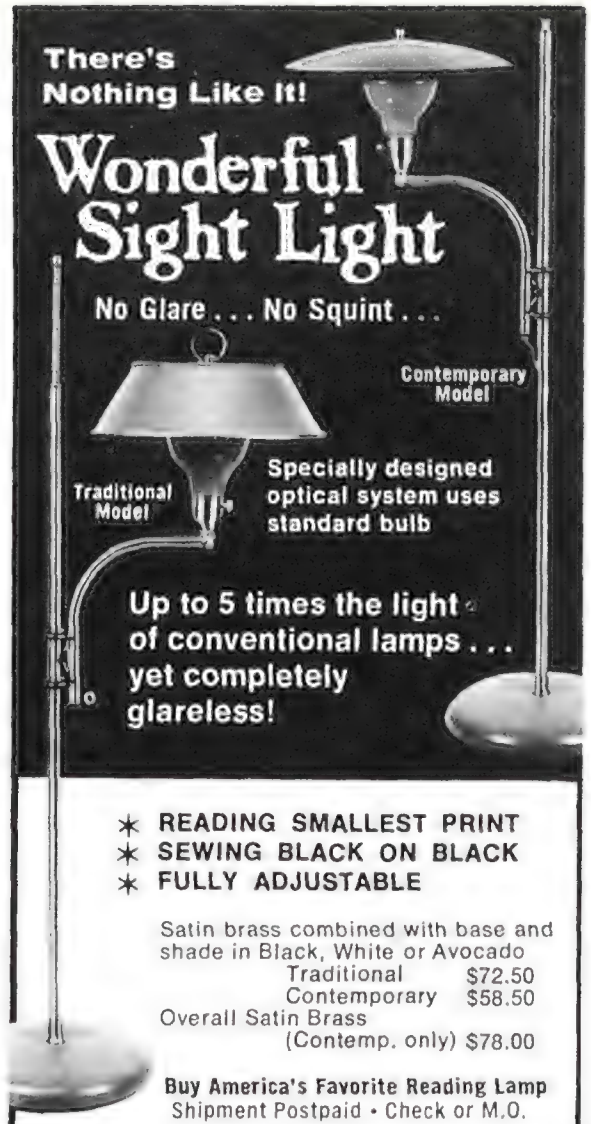

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By Peirce Lewis

To revive urban downtowns, show respect for the spirit of the place

A geographer suggests that preservation on a massive scale of a city's history can do wonders for its central business district

American cities, over the years, have come in for a good deal of abusive criticism. To a historian, much of the criticism seems old hat, for it is aimed at conditions which are as old as cities themselves: corrupt administration, brutal police, bad sanitation, undependable transportation and violence in the streets. But over the last 25 years or so we have been hearing a new kind of criticism, provoked by the realization that the internal layout of American cities—their very *geography*—is changing in quite fundamental ways.

The most basic change—and therefore the one which has provoked the most alarm—is the rapid disappearance of the one thing that *all* cities were supposed to possess: a central business district. It was the city's core in all important ways: the arena of high-order economic exchanges, the place of most intense social intercourse, and the locus for ceremonial occasions. But above all, the central business district had become the symbol of urban identity.

There *are*, despite hand-wringing among urbanites, ways in which downtown areas may be saved, while keeping their historical value, as shown in the photographs accompanying this article. First, however, we must understand the nature of such places.

The downtown area was the place where citizens rallied when the city was threatened, where they gathered to celebrate in the days of the city's triumphs. Downtown—with its gloriously unnecessary monuments, its public buildings (grand beyond any need)—was the home of the city's most potent and protective gods. The ancient Romans recognized this idea when they talked of *genius loci*—the spirit of a place, which represented in some supernatural way the essence of a particular locale.

Medieval and Renaissance cities, whose monotheistic Christianity forbade their invoking special gods, built cathedrals in honor of patron saints; the open spaces in front of them came to be not merely hubs of commercial activity, but monuments to a city's own special protective spirit.

Americans, with their separation of church and state, have seldom used expressions like *genius loci,* and most of us would feel vaguely uncomfortable at the idea of a special spirit, hovering over and protecting, shall we say, Miami Beach or Dallas. But we know very well that the downtown areas of our cities are more than marketplaces, more than mere "C.B.D.s" (Central Business Districts).

Other parts of our cities might go to pot—and often did. But somehow we felt that if a city's center was lively and sound, the city itself was sound. A city without a core was at best only a caricature of a city, at worst no city at all. Yet despite the outcries of alarm, that is precisely the kind of city that is becoming the American standard. Chauncy Harris and Edward Ullman described 30 years ago a thing they called a "multinucleated" city, but commented that it was merely one of several geographical forms that American cities were observed to take. By 1962 Mr. Ullman,

Boston

The old and the new in Copley Square: Trinity Church reflected in the nearby glass facade of the John Hancock Building. The city resisted centrifugal force of the suburbs by numerous redevelopment projects.

realizing that he had understated the case, asked the not-so-rhetorical question: "Are cities really necessary?" And today the coreless multinucleated city is the *main* form in the United States. Its cause is the mobile American with an automobile, who moves to and works along the fringes of the city, with green grass and wide highways, where jobs are both available and accessible, and where day-to-day commercial services are provided by sprawling multifunctional shopping centers. Indeed, many of these centers are now so big and diverse that we must think of them as central business districts in their own right.

This new multinuclear urban form comes in several subspecies, each a variant of the standard model. In a city like Boston—with a long tradition of a nuclear downtown—the new peripheral nuclei began to emerge after World War II at the intersections of radial roads and the now-famous bypass, the innocuously named "Massachusetts Route 128." Because Boston's downtown was old and strong and well-beloved, richly endowed with all kinds of emotional and institutional commitments, it has managed (with the help of favorable tax assessments) to fight off suburban competition more effectively than have most other American cities.

In the Western and Southwestern states, however, large-scale urban growth either accompanied or postdated the democratized automobile. A pre-automobile city like San Francisco with a well-defined core is a

Philadelphia

Careful preservation of its past, such as Independence Hall (right) and residential areas like Society Hill, plus a new commercial area with pedestrian malls, has made the city a model of intelligent urban renewal.

real rarity. The Western model of the multinucleated city is, of course, Los Angeles—scornfully described as "50 suburbs in search of a city"—a phrase invented (I suppose) by Easterners.

But the commonest and, I think, the most poignant model is neither Boston nor Los Angeles—but instead an intermediate form: the middle-aged cities, such as Detroit, which came of age during the railroad era of the late 19th century, and which, by the early 20th century, had developed healthy C.B.D.s. Like many other cities of the same age, whether big places like Buffalo or smaller places like Harrisburg, Detroit suddenly saw its central functions uprooted and set down again in the much-publicized suburban shopping centers which ring the old city, sucking off its vital juices and usurping its functions.

Ironically, but not surprisingly, Detroit's attempt to resist suburban competition simply contributed to her undoing. Accessibility was seen as the key to the shopping centers' success; and so, to make the downtown area accessible, an expressway system was cut ruthlessly across the city's interior, chopping some of Detroit's most useful neighborhoods into the urban equivalent of corned beef hash. And, without a trace of irony, "urban-renewal" money was used to demolish a good deal of downtown Detroit, in hopes of making it resemble as much as possible—what? A suburban shopping center. Small wonder that the term "downtown," once a shorthand for urbanity and cosmopolitanism, was replaced by the term "inner city," conjuring up images of racial oppression, poverty, alienation and terror.

Now it may be that we are making far too much fuss about something that is out of our control anyway. One can make a plausible case that the disappearance of city centers is an inevitable concomitant of our changing technology of transportation. Just as railroads put old canal cities out of business, so now the old railroad cities are being pulled apart by the automobile. After all, as suburban shopping centers grow bigger and more sophisticated, there is hardly any downtown commercial function they cannot perform. Even football and baseball teams no longer need cities, much less downtowns. We now possess teams that purport (at least) to represent California, Minnesota and even the whole of New England.

Not many people have had the audacity to push this argument to its ultimate extreme, but its logical conclusion is that we should cease our efforts to save downtown. It is doomed anyway. Emotional pleas to save it, continues the argument, are just so much nos-

Peirce Lewis is a geographer at Pennsylvania State University. His article is based on a paper for the American Association for the Advancement of Science.

Washington, D.C.
Restored townhouses, recalling the capital's early years, face the greensward of Lafayette Square. They now house offices of Executive Branch employees, as does a complementarily designed building behind.

talgic claptrap. Worse, they encourage us to pour billions of scarce dollars down a bottomless urban rathole. Instead of trying to breathe new life into downtown areas, we should find the least expensive way to bury our urban corpses as quickly and decently as possible. In the meantime, we should relax and learn to enjoy the shopping centers. (Most tastes are cultivated, anyway.)

We cannot reject the possibility that central cities may disappear, but obviously, there is no reason to believe that central cities—in the traditional sense—may not be with us for a long time to come, especially in the East and Midwest. And if *that* is so, then it is worth reminding ourselves once more of what central cities have meant to Western society, the absolutely crucial role they have played in defining the quality of *place*—the *genius loci*—which has so often determined whether or not a city is a good place to live.

It is worth remembering, too, that the terms "urbane" and "cosmopolitan" were not derived from shopping centers. It is a rewarding exercise to imagine Lorenzo de' Medici ruling Florence from an air-conditioned palace at the intersection of two autostradas. Or reflect, if you please, on the spectacle of Socrates discoursing on excellence at the entrance of a shopping-center parking lot, with Muzak playing in the background. Seen in this light, the preservation of the downtown areas of American cities becomes something other than an exercise in futility; it is instead an urgent public necessity.

Instead of justifying downtown preservation on economic grounds which, as we have seen, are dubious at best in contemporary times, we can justify it on the same grounds that societies since time immemorial have used to sanctify and preserve their traditional holy places: civic piety. Downtowns, with their monuments, their plethora of public and private memories, are necessary for continuity, whether or not they are places of immediate financial profit. Looked at in these terms, whole downtowns suddenly become candidates for what we have traditionally called "historic preservation."

Until recently, such an appeal in the United States would have seemed grotesque. Historic preservation

New Orleans

Preservation of the entire French Quarter is credited with revitalizing the nearby commercial districts. So successful was the effort in the Quarter that its funky ambience may be lost as the affluent move in.

was all very well in its place. If the state of Kentucky wanted to preserve the log cabin where Abraham Lincoln was born, that was fine—even finer to ensconce it in a Greek temple to make sure that you knew it was history. If the Rockefellers wanted to take the corpse of Williamsburg and dress it up in 18th-century hoopskirts, that was all very well as long as it didn't get in the way of progress. History was not a dimension of human experience, but instead a neat sanitary place with definite limits, cordoned off from the real world by white picket fences, labeled "History." The business of America was business, and "history is more or less bunk," in the words of the original Henry Ford. That was particularly true in the central business districts of American cities—the quintessential marketplaces.

Not surprisingly, the historic preservation movement in the United States has a dismal record of preserving urban environments. Part of the reason was nothing more complicated than the modest ambitions of the preservationists. With limited funds, governmental indifference and considerable organized hostility against them, urban preservationists were usually content if they could save famous buildings here and there, and helplessly stood by while whole cities disappeared before their eyes.

But the idea of extensive historic preservation of center-city districts is less bizarre than it once seemed. For one thing, there is reason to believe that Americans are losing their antihistoric bias. More and more Americans—as Alvin Toffler has shown us—look into the future to see if it works and discover instead that it is full of shock. Meantime, the accouterments of the once-despised past became increasingly attractive. Whether it is natural foods à la Euell Gibbons or the skyrocketing prices of antiques, there is increasing evidence of a hunger for tradition, for roots, for solidity that is almost unprecedented in the United States. As one antique dealer happily expressed it a short time ago, "Nostalgia is a growth industry."

So far, preservation has mainly been confined to a few of our older cities which suddenly and happily discovered that they had overlooked a few blocks of old houses. Renovating such houses, however, requires both money and a certain kind of education, and it

is hardly surprising that the restoration of antique neigborhoods in American cities has been, until recently, largely the business of the rich. (It is not by accident that much historic preservation has a distinctly elitist tone about it.)

Many cities in the United States which grew during the 19th century now possess at least one such area: Boston's Beacon Hill, what remains of Society Hill in Philadelphia, Georgetown and Capitol Hill in Washington and, more conspicuous because they are smaller towns, Charleston, Savannah and Lancaster, Pennsylvania. Aside from their antiquity, most of these historic districts have one important geographic element in common: They are close enough to the central business district to raise hopes that the nearby historic district may help resuscitate a dying downtown.

There is one place where historic preservation has breathed new health into an adjacent downtown, and done so on a large scale. That place is New Orleans, and it is possible that New Orleans' recent experience with historic downtown preservation may give us some idea of what might happen if similar attempts were made in other American cities.

This is not the time or place to review in detail the means by which the city of New Orleans managed to preserve the Vieux Carré—the picturesque old French Quarter—a 260-acre district which marks the boundaries of the old Franco-Spanish city as it existed when the United States under President Jefferson bought Louisiana from Napoleon in 1803. During the 19th century, the main business core of the city had migrated from the center of the Quarter at Jackson Square upriver to the edge of the Quarter along lower Canal Street. (This condition, incidentally, where a C.B.D. has shifted away from a city's old core, has a predictably preservative effect, for it diverts speculative attention from the old buildings—which are thereby automatically preserved by benevolent neglect.)

Fortunately for the old Quarter, New Orleans had gone through a long economic eclipse after the Civil War, and there was little reason to tear down the colonial buildings. And so, New Orleanians had come to love the old French Quarter, celebrating its mildewed antiquity in poetry, novels and romantic little pencil sketches. Thus, in the 1930s, with the help of the W.P.A. and an agreeably corrupt legislature in Baton Rouge, the French Quarter was institutionalized in the Louisiana Constitution as a protected historic district where no architectural changes would be permitted without the consent of the stiff-necked Vieux Carré Commission.

The authors of the enabling legislation insisted that preservation, to be meaningful, had to be plausible. Thus, it was not enough to preserve a few isolated buildings of architectural merit or historical distinction. It was necessary to preserve what they called the *tout ensemble*—the total environment. Thus, even mediocre buildings, if they contributed to the *tout ensemble,* would be saved from the wrecker's ball. The concept rested on the proposition that the Vieux Carré's importance was symbolic, not primarily economic, and it naturally outraged property owners who took the Commission to court—in vain, as it turned out. Over the years, the Commission has managed to beat off repeated legal challenges, but its ultimate victory came in the late 1960s, when the preservationists halted the building of an interstate highway along the riverfront of the Vieux Carré—largely on grounds of environmental esthetics.

Will success spoil the Vieux Carré?

Meanwhile, the French Quarter has gradually become one of the best-known tourist attractions in the country. Next to the port of New Orleans, its tourist revenue is the largest source of income in the city. And, in the context of which we are speaking, the Quarter is a howling success. The central business district of New Orleans, immediately adjacent to the historic district, is one of the healthiest C.B.D.s of any city in the country. Convention business is booming, and to the satisfaction of the Chamber of Commerce of the New Orleans Area, in the Quarter—and adjacent to it—things are jumping.

But economic success has brought troubles with it. If the example of New Orleans is to serve us at all, potential imitators should pay attention to them. At the base of the trouble is the indisputable fact that nothing succeeds like excess. The French Quarter's much-touted success has attracted entrepreneurs to whom the Quarter is not the home of the city's *genius loci*, but, as Professor Donald Deskins of Pennsylvania

Cincinnati

Cast from Danish cannons in 1871, the Tyler Davidson fountain was the first to dispense icewater. Today it reigns benevolently over what used to be a public market and is now a focal point of modern commerce.

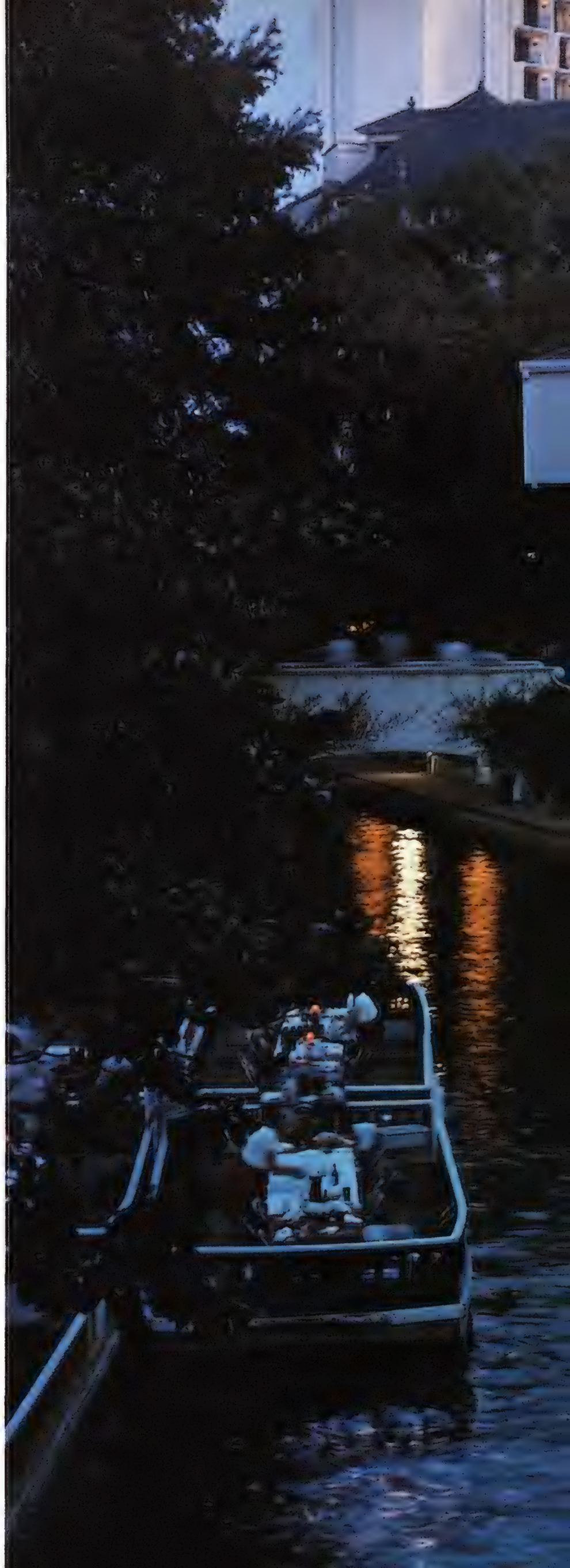
State University has described it, "Creole Disneyland."

Most appalling to those who love the old Quarter, local and outside real estate speculators have found that picturesqueness is a salable commodity, and if the seedy old buildings are not picturesque enough, they can be made so by a generous frosting of cast-iron railings, made, if necessary, of genuine plastic. And there is a general tendency to "clean things up" for the tourists.

Even more alarming are the functional and demographic changes which success has brought about. Not so long ago, the Quarter housed a population of considerable diversity—white, black, rich, poor, hippie and square. Twenty-five years ago, 20 percent of the Quarter's population was black; now it is about 5 percent, an obvious result of steadily rising rents. Not too long ago, wandering hippies (they used to be called Bohemians) could find cheap housing in the Quarter, and a tolerance of eccentric behavior which lent the place a good deal of its charm. But garrets are rapidly being converted into apartments and pieds-à-terre for the affluent, and every year there is less and less room for transients—who are forced to find refuge elsewhere.

Meantime, prosperity rolls across the Quarter, driving out all but the very white, the very rich and the very standardized. The *genius loci* of New Orleans threatens to look less and less like Louis Armstrong and more and more like Colonel Sanders.

Is there a moral to New Orleans' success story? Not, I think, that we should reject the idea of historic preservation as a potential tonic for sick downtowns. Without such preservation, downtown New Orleans might well be as sick as Detroit, and the French Quarter—if it were still standing—would be an obvious candidate for urban renewal. The moral has less to do with historic preservation than with central cities in general. The New Orleans example suggests, perhaps, how ill-prepared we are to deal with *any* successful downtown area. We are so accustomed to decaying downtowns that we have become unaccustomed to coping with successful ones—the economic dislocations and the forced migrations that success inevitably will provoke. Unless we are careful, the kind of standardized city which 1975 seems ready to call successful will surely bring the loss of something more subtle but immeasurably valuable: the *genius loci* that lends character to cities and makes them places worth saving.



San Antonio

In a city that blends its modern American character with the influence of Mexico, the rechanneled and landscaped San Antonio River helps to make this what cities should be—a lively place for people.

Haleb, "Pride of the Desert," was given to Davenport by a pasha. Stallion's skeleton is at the Smithsonian.

Davenport (with helmet) meets Anazeh sheikhs. Supreme sheikh, Hashem Bey, is fourth from the left.

By Anthony Amaral

Quest for Arabian horses became a desert odyssey

Homer Davenport turned his equine hobby into a grand international project and established bloodlines of a superb breed

"In this, the beginning of the horseless age," wrote the esteemed political cartoonist, Homer Davenport, in 1906, "it seems idle to advocate horses of any sort; yet I must maintain that the Arabian horse has a distinct place awaiting him. . . ."

He was soon to depart for Bedouin desert lands where he would acquire 27 of the rarest breed of horses in the Western Hemisphere. The Arabian was an exotic that, in the minds of Americans, figured as a mythical backdrop to the *Arabian Nights*. The breed is known for its grace, beauty and stamina. It is easily recognized in action, for it carries its tail much higher when in motion.

The story of Homer Davenport's fascination with Arabian horses is recounted in his book, *My Quest of the Arabian Horse,* and it is impossible to retell the tale without leaning heavily on Davenport's own words. In 1893 he saw his first Arabian at the Chicago world's fair while on assignment for the *Chicago Herald*. By permission of the Turkish Sultan, the Ottoman Empire was represented by 45 Arabian horses and the best horsemen from the Bedouin tribes. Davenport

turned into a camp follower and learned firsthand the zealous regard of the Bedouin for his horse.

One day, Davenport sketched a stallion named Obeyran. The animal was at rest, tail hanging, relaxed. Davenport displayed the drawing to the desert men. "Obeyran!" they exclaimed. Then harsh tones followed, and suddenly a sword slashed through the drawing. Davenport and two guests were thrown bodily out of the camp. Later, an English-speaking Syrian explained that depicting Obeyran with his tail drooping (a graceful arched tail when running is the distinct pride of the breed) was taken as an insult.

Davenport rapidly gained national prominence as a political cartoonist. He funneled his earnings into a small farm at Morris Plains, New Jersey. Among his hundreds of species of birds, Persian sheep, Sicilian donkeys, Angora goats and various dogs, were 16 Arabian horses, left over from the Chicago world's fair.

All were supposed to have been returned to the desert, but to satisfy creditors they had been put on the auction block. The choicest stallions found a home in the stables of a Boston industrialist, Peter Bradley. Davenport traced them, made friends with Bradley and developed a partnership concerning the horses. Some were eventually transferred to Davenport's farm.

In 1904 Davenport, now of the *New York Evening Mail* and a recent convert to the Republican Party, journeyed with a group of politicians to Sagamore Hill to call on Teddy Roosevelt, the acclaimed choice for the Republican Presidential nomination. Roosevelt was skeptical of Davenport. He had flinched at the sting of some of Davenport's cartoons and his association with William Randolph Hearst. But that afternoon Davenport confessed to TR's private secretary that he was convinced that Roosevelt was the best man.

The secretary interjected that Roosevelt had "a full set of enemies."

"Enemies? Of course," Davenport replied. "But . . . he's good enough for me."

"He's good enough for me" became the caption of a front-page cartoon the next day. And Roosevelt was more than willing to honor Davenport's request that the President use his office to ascertain if Arabian horses might be exported from Arab lands.

Davenport's cartoon "A Farewell to the Horse" was drawn before his journey. His sketch of the Sultan of Turkey (center) could have caused the loss of his shipment, since it was illegal to show the ruler's likeness. At right, Davenport records Bedouin horse-dealing among the Anezeh tribesmen.

Davenport wanted to go to the desert himself to select horses. He believed that most of the world's fair horses were town Arabians—virtually a different breed—and wanted to visit the Anezeh tribe, the most warlike and the most noted for their horses.

Roosevelt, who presumably heard these sentiments from Davenport, had in mind a plan for a cavalry stud based on Arabians. So he declared his interest in Davenport's request.

Armed with documents, Davenport hastened to Washington to meet the Turkish ambassador, Chikeb Bey. An ardent horseman himself, Chikeb promised to make an earnest appeal to Constantinople, but warned that getting horses from the desert, especially mares, was almost impossible. Mares were cherished more than stallions by Arab tribesmen. They went to war on their backs because they were less likely to betray a stealthy raid with impromptu nickers.

A few days later, to the surprise of Chikeb Bey, a return cable from Constantinople simply asked how many horses Davenport desired. Not wishing to appear greedy, he decided on six or eight. So an Iradé, a decree from the Sultan, authorized him to take from the Turkish Empire six to eight horses.

On July 5, 1906, he sailed from New York with two companions, John Thompson jr. and Arthur Moore, and arrived in Constantinople July 19. An American official doubted the authenticity of the Iradé, but agreed to check at the palace and returned, not only with the Iradé but also with an added permit to export mares as well as stallions. In fresh spirits, Davenport set off for Beirut, Alexandretta, Antioch and finally Aleppo, where he hoped to make contact with the migrating Anezeh, who had the purest horses.

In Beirut the party obtained an interpreter named Ameene Zeytoun, a fortunate addition to the group, for in Alexandretta the party's guns were confiscated by an influential Turk. He suspected Davenport of being a gun manufacturer attempting to make contact with recalcitrant desert tribes. Davenport left Zeytoun and Thompson in Alexandretta to clear things up while he and Moore headed for Aleppo.

The coach ride was tedious and unbelievably hot on the old Roman road. A wheel came off, then a horse threw a shoe. Marooned in Antioch, Davenport and Moore could only communicate with the inhabitants by gestures. For a day and a half they milled around under the blazing sun, watching camel trains passing through "as silently as if they were ghosts."

Fortunately, they found an individual who spoke a few words of English and surmised that a mail coach would soon come through on its way to Aleppo. That proved true enough, but only a bribe persuaded the mail official to look the other way while the two Americans boarded it and jolted along through the night on lumpy mail sacks.

Anthony Amaral of Carson City has written books about horses and is just finishing Wild Horses of Nevada, *about to be published.*

Wadduda, a war mare, was given to Davenport by Akmet Haffez, diplomatic ruler of the desert, when he realized that the American had called

on him before presenting himself to the governor. Davenport (above) reached tents of the Anezeh where his bridle was hung—a Bedouin sign of welcome.

In the forenoon Davenport and Moore were abruptly disembarked in the desert outside Aleppo because the official decided it would not be proper for foreigners to be seen leaving the coach. Davenport flopped on the sand under the sun, "as hot as it could possibly be, without burning things," and waited, hopefully, for another coach. In late afternoon it arrived and deposited them in the middle of Aleppo. Instead of an oasis, as he had imagined, he found a city of stone and mud "tumbled down so many times by earthquakes that it looks as tired as the old Roman road that leads up to it. . . . We were half starved, and tired out from the night ride and the effects of the sun. Our spirits were low. To tell the truth we were thoroughly broken down. We had cold feet, although it was 125 degrees in the shade."

The next morning, after they had rested a bit in a bad hotel, the arrival of Thompson and Zeytoun with the guns brought momentary cheer. Their coach team had gone over a precipice, crowded off by a camel train. Both had jumped to safety just in time. As Davenport later wrote, "When you're at home sitting on the shady side of your porch planning the exportation of Arab horses, there are some details which you overlook. . . ."

Davenport wasn't sure if the Anezeh were within a thousand miles of Aleppo. Turkish officials in Washington had told him where migrating tribes should be in summer, but in Beirut he had heard different conjectures. Thompson urged him to go to the bazaar where horse saddles and bridles were made. Wandering through the milling crowds, Davenport noticed a dark-skinned man with particularly white teeth. He recalled reading that the "Anezeh tribe had peculiarly white, chalk-like teeth." He instructed Zeytoun to ask the Arab if he knew anything about the Anezeh. Moore chuckled and suggested that Davenport's source was merely a camel driver. Moments later, Zeytoun reported that the Anezeh were within ten hours ride of Aleppo. Then another Arab, older, with a grayish beard and those distinctive white teeth, joined the group, and more conversation through Zeytoun revealed that Hashem Bey, Sheikh of all Sheikhs, was in Aleppo visiting with Akmet Haffez, diplomatic ruler.

Davenport hustled Zeytoun, Thompson and the elder Arab (Moore was still skeptical and went off to look at rugs) into a carriage and drove to a two-story stone and mud house on the outskirts of town. They were admitted by a slave. A few minutes later, after peering at a number of rifles scattered on a divan, Davenport was greeted by a dignified Arab looking "like a bronze Grover Cleveland in his last years." Instantly a slave was serving coffee, while Zeytoun politely asked about the Anezeh sheikh.

Akmet Haffez replied that the sheikh had been a guest for the last ten days, but had departed the night before. Haffez said he had heard of people in Antioch who had an Iradé from the Turkish Sultan and a letter from the "Great Sheikh of all the Americ tribes." Zeytoun confirmed that these were the very gentlemen. At

that, noted Davenport, "The old man's eyes filled with tears as he looked at me and his slaves and secretaries grew more interested. . . . 'Then you have called on me before calling on the Governor of Aleppo and Syria. No such honor was ever paid to a Bedouin before, and if I should live to be one hundred years old, my smallest slave would honor me more for this visit.' "

Thus a breach of protocol gave Davenport his chance. Haffez announced that although he had not ventured into the desert for 30 years, he would himself escort Davenport there. He sent a racing camel to the Anezeh with a message not to move tent or go to war. He then presented Davenport with the finest war mare in the desert, Wadduda, prancing restlessly in the courtyard. No letter of credit, or Iradé, could have given Davenport a mare so highly prized.

The next day Haffez accompanied Davenport and his companions to call on Nazim Pasha, the governor of Aleppo. There was a glow on the old Bedouin's face, for he was now in the position of introducing foreign guests. The governor greeted Davenport cordially and appeared unoffended by the shattering of etiquette. He examined President Roosevelt's letter and the Sultan's Iradé, and horse talk ensued. Nazim Pasha spoke of the stallion, Haleb, the "Pride of the Desert." Davenport had heard of the horse: A rich offer for it from the Italian government had been refused.

"You have accepted the present of the war mare, Wadduda, from Akmet Haffez," said the pasha. "You must accept this horse as a present from me."

About five o'clock that evening Davenport's party, accompanied by Haffez and one of his sons, departed for the desert. Camels with tents and provisions had set out earlier. The governor offered an escort of 12 soldiers, since Davenport was carrying gold, but Davenport refused. Haffez's presence, he felt, was worth an army. Turning down an escort caused an enthusiastic stir among the town Arabs, and Haffez explained that Bedouins considered Europeans cowardly who went to the desert accompanied by soldiers.

Shortly after midnight they rode into the camp of a cousin of Haffez and were feasted with rice and lamb, melons, clabbered milk, all the best that the desert people could offer. After a short sleep, at three in the morning, horses were saddled and the ride continued through the night to escape the heat.

Just before midday, Davenport, exhausted from the heat and having ridden longer than he had for years, topped a sandy knoll. Haffez rode up, pointed and shouted "Anezeh!"

Davenport peered through the haze on the great plains at black tents and thousands of camels shimmering in the heat waves. Davenport gazed in awe upon ancient, living history. He saw horsemen galloping to-

William (Buffalo Bill) Cody sits astride Muson, one of the Davenport imported stallions.

Bedouins bid farewell to the stallion, Haleb, as Davenport prepares to leave for home.

ward them, waving their hands in greeting. Wadduda was prancing. In town, the mare had been difficult, laying back her ears, ready to strike or bite Davenport whenever he approached her. Bedouins said she didn't like the town corral. She wanted to go back—and they pointed to the desert. Now, Davenport shared the mare's excitement. He urged her forward and "she started galloping with a delightful spring. It was the return home, the call of the wild life with its thrills of wars and races."

Sheikhs with beards and long robes gave the traditional greeting of bowing and touching of right hand to lips and forehead. Hashem Bey, the great sheikh, was not in camp, having taken a war party across the Euphrates. He would return in a few days.

In a large reception tent, the bridle of Wadduda was tied to a center pole, denoting that Davenport was welcome. Feasting commenced, and Zeytoun suggested to Davenport that he say something. He thanked Akmet Haffez for bringing him to such a people, for it was a supreme moment of his life.

Haffez stipulated what he expected in dealing for horses. "I have presented to this man the great war mare which came to me from your great sheikh, Hashem Bey. You know, as all Bedouins know, that no European could have purchased that mare at any price, but I have given to him the mare Wadduda, whose name means love and affection, and under that name I have given her to this man that she may be a living witness of the affection for him, not only of myself but of the whole Anezeh tribe. . . . So now treat the man as you would one of your own tribe."

Haffez conducted the sale of horses like an impresario. A seller would bring a horse to Davenport and Haffez to inspect, then squat on the sand and wait without trying to straighten the mane or hide defects. If a horse had a blemish, the Bedouin would position the animal so it was seen. If the offered price was unsuitable, the seller would get up silently and lead the horse away. When the price was acceptable, Haffez would call Davenport to where the horse stood, take the right hands of buyer and seller, join them and rest his own hand on top, requesting that they "ask the Sheikh of the tribe to put his seal on the bargain." If the Bedouin answered yes, Haffez would toss the hands and so close the deal.

Only Haffez's presence, however, prevented gouging. Later, in a Circassian village near the Euphrates, a Bedouin approached Davenport with a beautiful filly. Davenport asked if the animal was "chubby," meaning a breeder.

"Yes," the Circassian replied. Just then Haffez walked into the scene and gripped the Bedouin's hand and demanded he swear to God that she was chubby.

"If you ever saw a fellow pull loose quick," said Davenport, "it was the Circassian."

After several more days of buying horses, Davenport broke camp and prepared to head for Alexandretta, the port of embarkation. While riding out of the desert an unusual event occurred. Davenport had learned that good mares could not be purchased. But five hours ride from Hashem Bey's camp, a Bedouin overtook Davenport. He was riding a bay mare, which Davenport had previously tried to buy, and leading her two-year old chestnut colt. Haffez concluded the purchase of the colt and the Bedouin promised to return the next day with its yearling brother. After bargaining the next day, the yearling joined Davenport's collection.

Davenport then made another offer for the mare and, surprisingly, the Bedouin promised to speak to his family about selling. Eventually a messenger from the Bedouin arrived and reported that the mare could be bought for 50 pounds—much more than Davenport had paid for any other horse—but he did not intend to quibble. He dispatched the messenger with the money and instructions to deliver the mare to Aleppo.

While Davenport was in Aleppo the messenger returned, but without the mare. The Bedouin now wanted a pistol he had seen in Davenport's party. Haffez was furious. "I will get the mare," he announced. He ordered his son and a soldier to accompany the messenger back to the owner of the mare. His instructions were blunt: "Bring her back alive, or her owner dead."

Davenport yielded to the strong measure, admitting that he wanted the mare "as she was the best in the Euphrates valley." To ease his own conscience, he sent along the revolver. The Bedouin again refused to honor the bargain: He claimed the revolver was not the one he wanted. The mare was taken by force, and became one of the most valuable horses of the Davenport importation. The Bedouin was later arrested for breaking his word.

Three hours' ride from Alexandretta, an American from the consulate rode up to warn Davenport that Turkish spies were waiting for him. It turned out that back in Constantinople he had sketched the Sultan—an unforgivable act. The American told Davenport that if such a picture were found every horse would be taken away from him.

Davenport pondered. The risk was enormous, yet he could not destroy the sketch of the Sultan. He hid the sketch in the middle of a bale of hay. Sure enough, in Alexandretta, while all the party's belongings were searched, the hay bales were loaded without even a casual glance. "No greater sigh of relief was ever heaved," Davenport wrote.

So in October 1906, the first Arabian horses ever obtained directly from the Anezeh tribe by an American disembarked in New York. They aroused considerable attention. Newspapers ran stories of Davenport's desert adventures, and a few letters to the *New York Times* questioned the purity of the horses. Only after considerable debate were the Arabians accepted as authentic. Finally, the Davenport importation was presented in an exhibition for President Roosevelt at Oyster Bay.

Davenport died of pneumonia six years after his expedition. He never saw the phenomenal rise in interest in this classic horse. Other later importations

Charles Craver of Illinois, largest breeder of Davenports, joins his wife, Jeanne, for a run with Tripoli, sire of 41 colts and, at age 27, the equivalent of a human about 75. One of his ancestors was Davenport's famed mare, Wadduda.

from long-established studs in England, Egypt and Poland mingled their bloodlines with the Davenport horses and the original style of desert horse faded away. Then, about two decades ago, enthusiasts began a renaissance of the Davenports. Fortunately, there remained some with a direct lineage from the importation. Breeders located these horses and reestablished Davenport bloodlines.

Today, thousands of Arabian horses show tracings of Davenport bloodlines, and about 180 go back, generation to generation, to the original importation. Owned mostly in small numbers, the so-called Davenports are found in Ohio, Illinois, Virginia, Tennessee, Arizona, California, New Mexico, Colorado, Washington, North Carolina, New York, British Columbia and Ontario. Three were recently exported to a Davenport admirer in Sweden.

The largest breeder of Davenport Arabians is the Charles C. Craver family of Craver Farms, Hillview, Illinois. Their herd presently numbers 80. In 1955 Craver made a survey to find descendants of the 1906 importation whose blood had not been diluted by subsequent importations from Europe. He finally located 25 horses scattered throughout the country and bought ten of these. One was the stallion Tripoli, descended on his sire's side from the stallion Deyr, purchased by Davenport in the Circassian village, and to Wadduda, Davenport's gift mare. Tripoli's maternal side claims Urfah, considered to have been the best mare Davenport obtained.

"I found Tripoli in northern California," says Craver. "He was as exciting a find for me as Tutankhamun's tomb was for Howard Carter."

Very few Davenports are shown in horse shows, although there is little reason to believe they could not win ribbons. Most Davenport owners incline toward stay-at-home-enjoyment of their horses. Riding English or Western, around a backyard or out on trails, or just driving a Davenport from behind a cart, seems to offer satisfaction enough.

By William K. Hartmann

If Mars once had rivers, was the sun then hotter?

Solar variations in temperature over geological time would have deeply affected not just the red planet, but the history of life on Earth

Before the flight of Mariner 9 in 1971, Mars might as well have been the moon. Mariners 4, 6, and 7 had revealed desolate craters and a very thin atmosphere with less than 1/100 of the surface pressure on Earth. The whole planet has not even enough precipitable water to fill the Great Salt Lake. Liquid water on Mars was known to be unlikely, and the temperatures were usually below freezing. Dry dust similar to the moon's blew across the surface in sporadic yellowish clouds. Conditions did not seem encouraging for life.

Had it not been for one discovery, Mariner 9 would have supported this Mars-model, a sort of desolate "moon with a wind."

Mariner 9's discovery was that Mars is laced with scattered channels that give every indication of being dry riverbeds. They meander in sinuous curves. They often have tributaries. They get wider and deeper in the downslope direction. They have interlacing deposits along their floors, resembling the "braided" sediments in terrestrial dry riverbeds. In short, they have everything riverbeds are supposed to have—except water. Astonished Mariner 9 interpreters knew that there is virtually no water on Mars. How, then, could Mars have riverbeds? Calculations showed that because of the low atmospheric pressure (equivalent to that of 100,000 feet above the Earth) and low temperature, liquid water would not last long enough on Mars to erode any channels. Under current Martian conditions, water would be frozen during most of a typical day; if liquid, it would rapidly evaporate or boil away.

In this painting by the author, based on Mariner plus other data, we look down at an ancient riverbed, complete with tributaries, cutting across the dry, cold

surface of Mars. The bright object above the horizon is the Martian moon Phobos. The discovery of the riverbeds raised a question: Where is all the water?

During most of 1972, discussion at Mars conferences centered around other theories of channel formation. Lava flows? Experts on lava flow morphology pointed out that lava flow channels get narrower and shallower downstream, not wider and deeper. Wind channels? None like the Martian channels had ever been seen. Fractures? *They* don't have intertwining braided deposits. On the contrary, geologists such as Daniel J. Milton of the U.S. Geological Survey testified that the Martian channels have the characteristics of arroyos cut in arid terrestrial regions, or where catastrophic floods have occurred. This led to a theory that seemed to explain some Martian channels that emanate from depressed, jumbled regions called chaotic terrain. Many investigators have agreed that these probably formed when subsurface ice, or permafrost, melted as a result of geothermal activity and flowed away, causing the collapse of the ground. Similar features, called thermokarst topography, are found on Earth.

But this theory did not explain two other types of Martian channels: Channels several miles wide with tributaries grading into flat desert, and smaller shallow channels existing in all terrain types near the equator. These types of channels most resemble arroyos in arid regions where rainfall—though rare—is sometimes severe, such as the Peruvian coastal desert or deserts of the American Southwest.

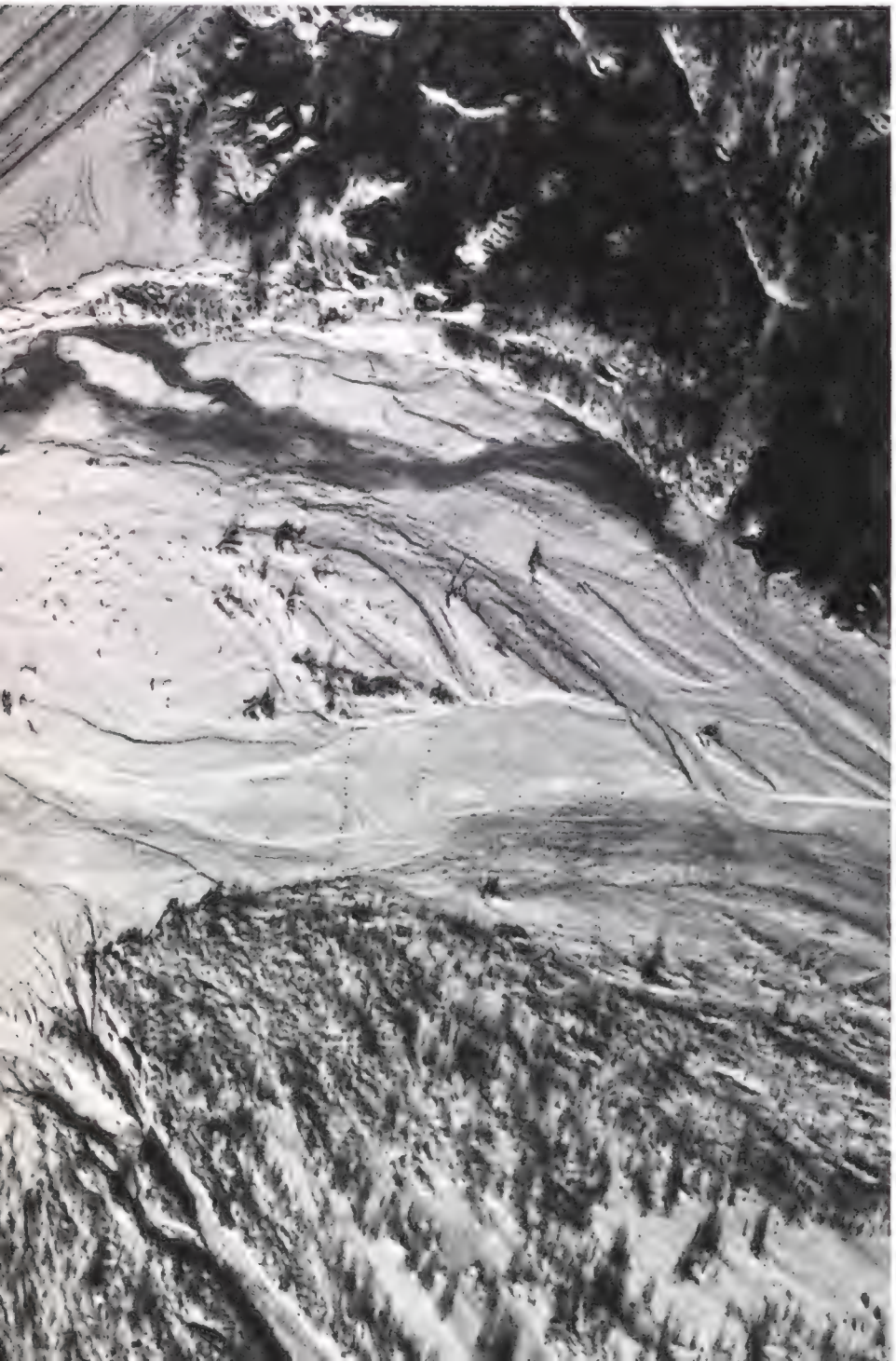
Since 1972, investigators have tried to answer the question of the water's source and the conditions that permitted it to exist in liquid form. The whole situation is unsatisfactory; for example, planetary chemist Fraser Fanale has argued that large amounts of water must have been evolved during Mars' history, but Mariner investigator Bruce Murray has pointed to the great difficulty of accounting for its whereabouts on present-day Mars. It may be in the seasonally changing polar ice caps of Mars, in underground permafrost deposits, and in hydrated water in Martian minerals; some of it may also have escaped into the atmosphere.

In any case, for the water to be liquid and erode the channels, temperatures and pressures must have once been higher on Mars. This requirement is consistent with more subtle Martian evidence, such as my own work on the erosional condition of Martian craters, which shows that much more erosion and transport of Martian soil occurred in the past, some hundreds of millions or billions of years ago.

How can we account for more heat and atmosphere in the ancient past on Mars? Even before the Mariner 9 mission, Cornell astronomer Carl Sagan had specu-

A co-investigator on the Mariner 9 *mission, William Hartmann is a senior scientist at the Planetary Science Institute in Tucson. He is coauthor of a book,* The New Mars, *published last year by NASA.*

Composite Mariner photo above shows braided sediment deposits in an arroyo system sweeping past an eroded crater on Mars. Below one sees similar deposits in a much smaller arroyo near Tucson, Arizona.



lated that orbital and precessional cycles might have altered the amount of sunlight reaching the poles, thus melting both polar ice caps simultaneously. This would put much more gas and water vapor into the atmosphere, and markedly alter the Martian climate. Bruce Murray and his Cal Tech colleagues found such cycles, but they appear too minor and too recent to account for the climate postulated for ancient Mars.

How else could the heat input into the Martian polar caps be increased? What about the ultimate source of Martian heat—the sun itself? Astronomers in recent years had already assembled unexpected evidence that the sun's output is not as stable or well understood as they once thought. Once the idea was accepted that the sun's energy might be variable, lines of evidence from several scientific disciplines began to weave together into a compelling tapestry.

The essence of the Martian evidence is that rivers, a warmer climate, and a denser atmosphere must have existed hundreds of millions or billions of years ago on Mars. The geology of some channels also suggests that *episodes* of warm conditions and fluvial activity may have occurred. To test the plausibility of Martian atmospheric changes, Carl Sagan, Owen Toon and Peter Gierasch computed the effects of increased solar radiation on Mars. They found that a 10 to 15 percent increase would raise Martian temperatures and could melt the polar caps. Polar ice would release carbon dioxide and water, and Mars might quickly alter to a new stable climate with an atmospheric pressure a significant fraction of that on Earth.

This calculation raised an interesting new concept of Mars as a bimodal planet, oscillating between two stable regimes—the present cold, dry Mars and a warmer, wetter Mars—depending on whether the sun is fainter or brighter than average. The Martian rivers may have run during a clement Martian episode—or episodes—when the sun was 10 to 15 percent brighter than it is now.

The missing neutrinos

Totally independent of the Martian problem is another mystery that has led astrophysicists to question the sun's stability. Experiments to measure solar neutrinos (sub-atomic particles emitted from the thermonuclear reactions in the sun's interior) netted a much lower count than had been predicted. The predictions had been based on the assumption that the sun continues to generate energy in its interior at the same rate now as in the past, when the visible radiation reaching us now was originally generated. (It takes about eight million years for energy to get from the sun's center out to its surface, where it radiates to the planets in a few minutes. The radiation we see today

was generated millions of years ago and tells us nothing about what is happening inside the sun today.) One way to explain the neutrino deficiency is to conclude that the sun is generating much less energy now than it has in the past.

Meanwhile, Sagan and Andrew T. Young examined data on a group of stars at the same distance from the Earth, in the star cluster Praesepe. Solar-type stars, instead of appearing uniform in brightness as expected for equidistant stable stars of the same type, appear to have a range of brightnesses, consistent with periodic variations among them. Thus, the solar and stellar evidence perhaps dovetails with Martian evidence for cool and warm periods.

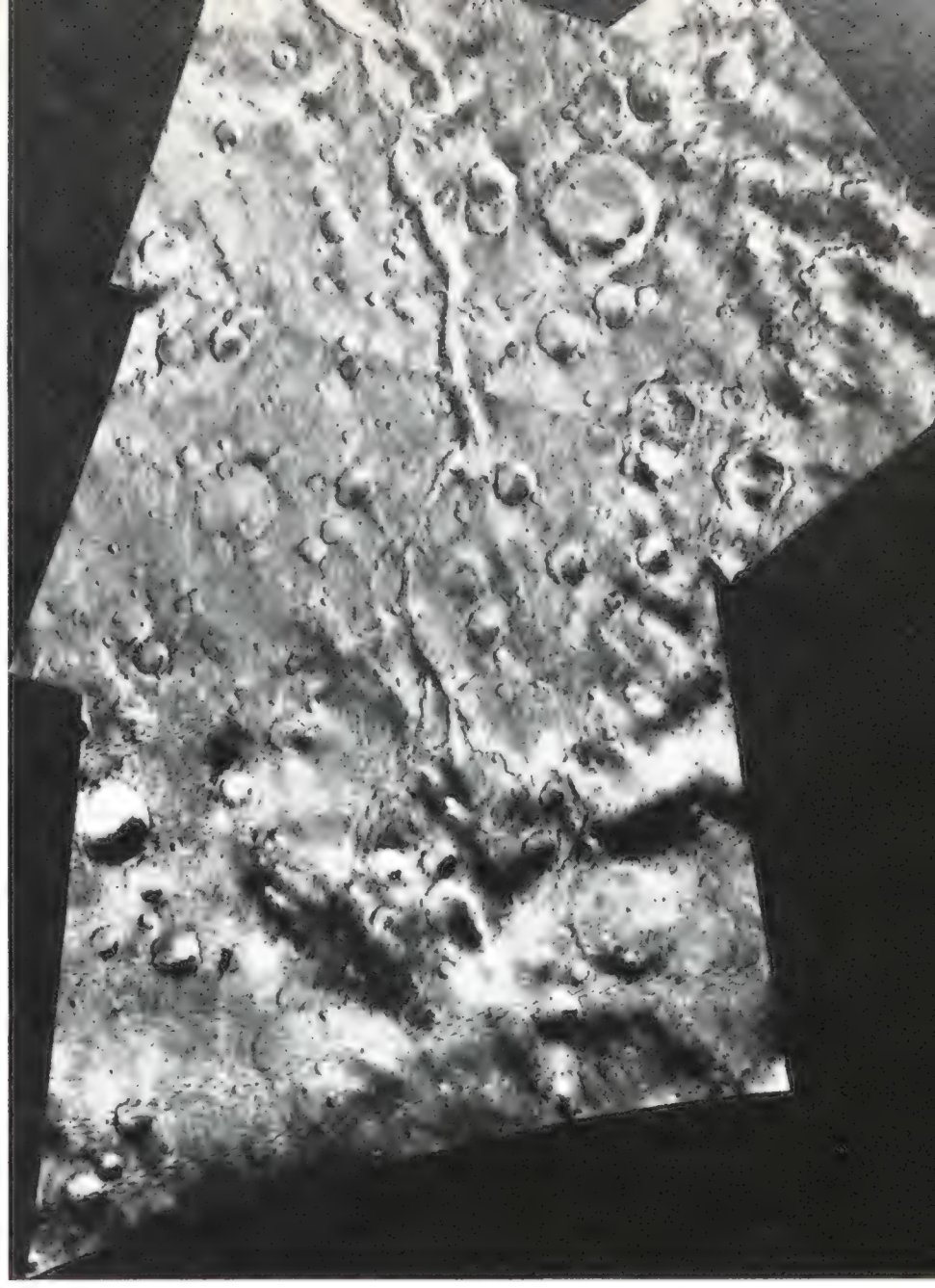
Geological evidence on Earth

But if solar variations change the climate on Mars, they must simultaneously change the climate of all planets, including Earth. There should be indications of this in the geological record. Such evidence is found in abundance, but it has been read different ways. For some years geologists had known about climatic evidence such as tropical ferns and corals about 280 million years ago near Spitsbergen Island (Svalbard) at 78 degrees north latitude. About 230 million years ago, the great Permian glaciation involved ice sheets covering many present day equatorial regions in Africa (at 22 degrees south latitude), South America (10 degrees south) and India (10 degrees north). Following this, an apparent warm period saw the rise of dinosaurs in Mongolia, magnolias in Alaska and figs in Greenland.

This kind of evidence played a role in a raging debate during the Fifties and Sixties. One camp explained the evidence in terms of continental drift—the glaciations meant that the continents had been at polar latitudes. Tropical fossils indicated a position near the equator. The other camp invoked solar variations. It was known that climate was a major factor in the evolution of species, and as early as 1953 astronomer Harlow Shapley introduced a volume on climate change by noting that "an absolutely steady sun and earth-crust for the past 400 million years might have left us living as Silurian ooze-browsers, unambitious, deprived of climatic stimulation."

In the 1960s the debate was "won" by the continental drifters. The theory of plate tectonics was firmly established, and it was conclusively shown that the continents *had* been at different latitudes in the past (see SMITHSONIAN, January and February 1975). The case for solar variations seemed to shrivel away.

But today we are faced with the provocative suggestion that the Earth, Mars and the sun are all in a cool period now (for the last few million years), and that all may have been warmer tens or hundreds of millions



Mosaic of Mariner photos shows a Martian channel that is about 440 miles long. Below is a channel of comparable width that cuts through a desert in Peru. Mars might look like this (without distant trees).

of years ago. Further, reexamination of the reported fossil evidence suggests that continental drift does not explain all the paleoclimatic data. For example, modern oxygen-isotope data on ancient seawater temperatures indicate planet-wide climatic fluctuations on the Earth. The ice-free poles, high-latitude coral, and widespread warm sea temperatures of the Jurassic, about 130 million years ago, are hard to explain merely as a result of the estimated continental positions at that time. (See maps p. 55) The base maps are adapted from R.S. Dietz and John C. Holden; the ancient climate and coral data is from Martin Schwarzbach, Carl O. Dunbar and others.) Modified ocean currents and other effects have been invoked to explain global climatic changes purely as the result of continental drift, but biologists have had to strain to account for sudden episodes of extinction of land and sea creatures.

Thus, a new hypothesis would be that the Earth's climate and biology have been affected both by continental drift and by solar variations. The solar variations would be hypothesized to involve long-term changes of perhaps 5 to 15 percent in luminosity, over periods of perhaps 200 million years. (Either erratic episodes or periodic cycles may be involved.) The carboniferous warm period of about 280 million years ago may have represented a solar maximum. Permian glaciation and extinction of species about 230 million years ago may have involved a solar minimum.

The rise of the dinosaurs during the warm climate of about 130 million years ago, followed by cooling and the dying of great reptiles 60 to 70 million years ago, may represent the most recent cycle. The last trickles in the Martian rivers may have occurred either during that last warm period 130 million years ago, or during an earlier warm period.

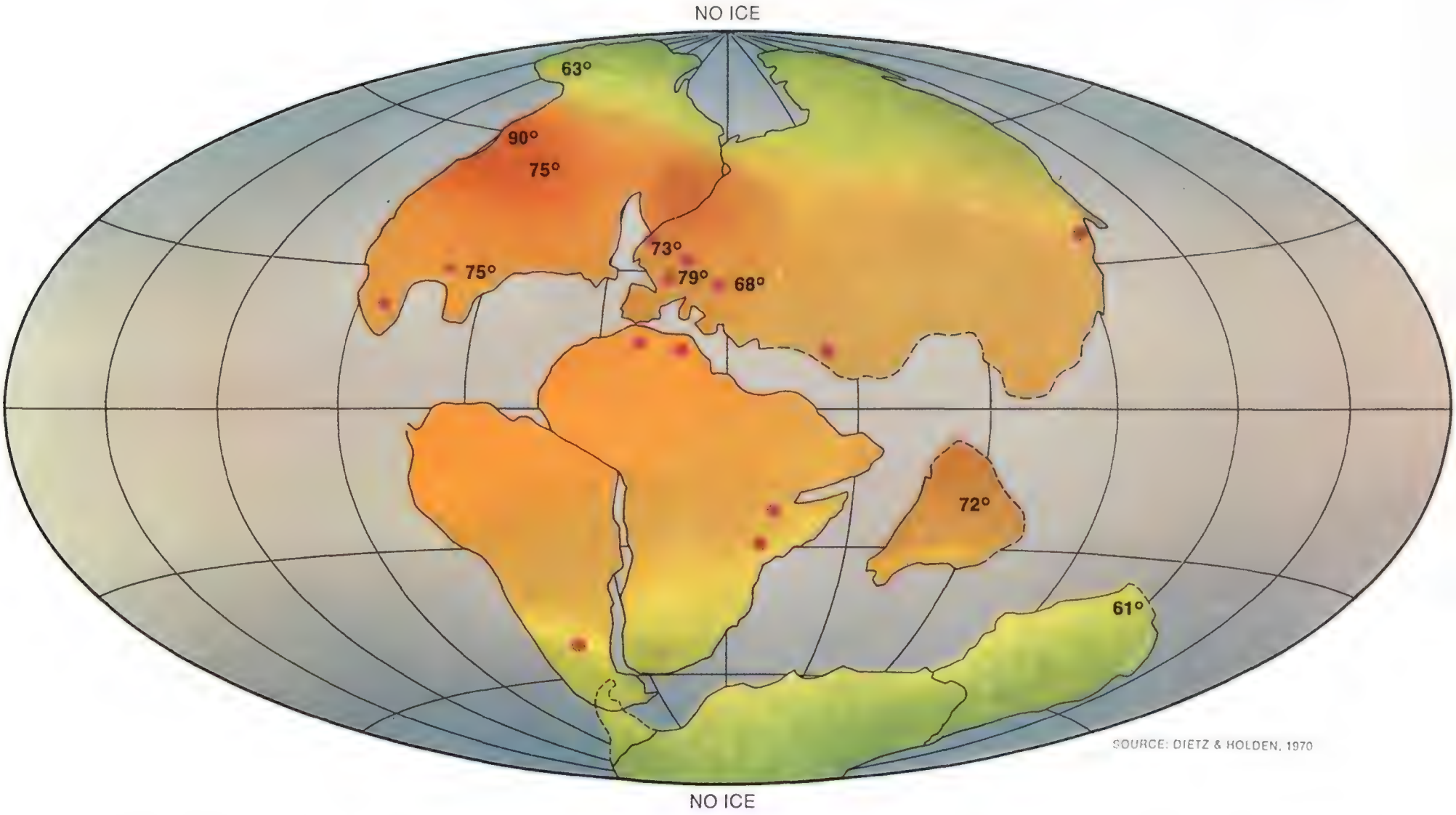
Could solar changes be the main factor in natural selection and species changes, such as the demise of dinosaurs? An example of detailed data is a 1972 report by two University of Chicago researchers, Leigh Van Valen and Robert Sloan, who discovered a sequence of Montana land and sea fossils that allowed analysis of causes of dinosaur extinction. They found that winter temperatures decreased some 60 to 70 million years ago, changing the flora and causing "an ecological succession in which the placental mammals out-competed the dinosaurs." Van Valen, Sloan and others have concluded from land and sea extinctions that the climatic change was worldwide. This fits the supposition that the sun might have been responsible.

If solar changes affected the climate and biology of Earth, what about Mars? What about planets of other stars? Dramatic changes in planetary climates caused by geologically sudden changes in the luminosity of their stars may be partly responsible for our current loneliness in the universe—why we have not been contacted in any obvious way by alien cultures. If life takes billions of years to evolve to substantial or intelligent forms, as was the case on Earth, but planetary climates oscillate widely every few hundred million years, then a planet has to be in a specially favored orbit to avoid being too close to its star (too hot) during the "warm" periods, and too far (too cold) during the "cool" periods.

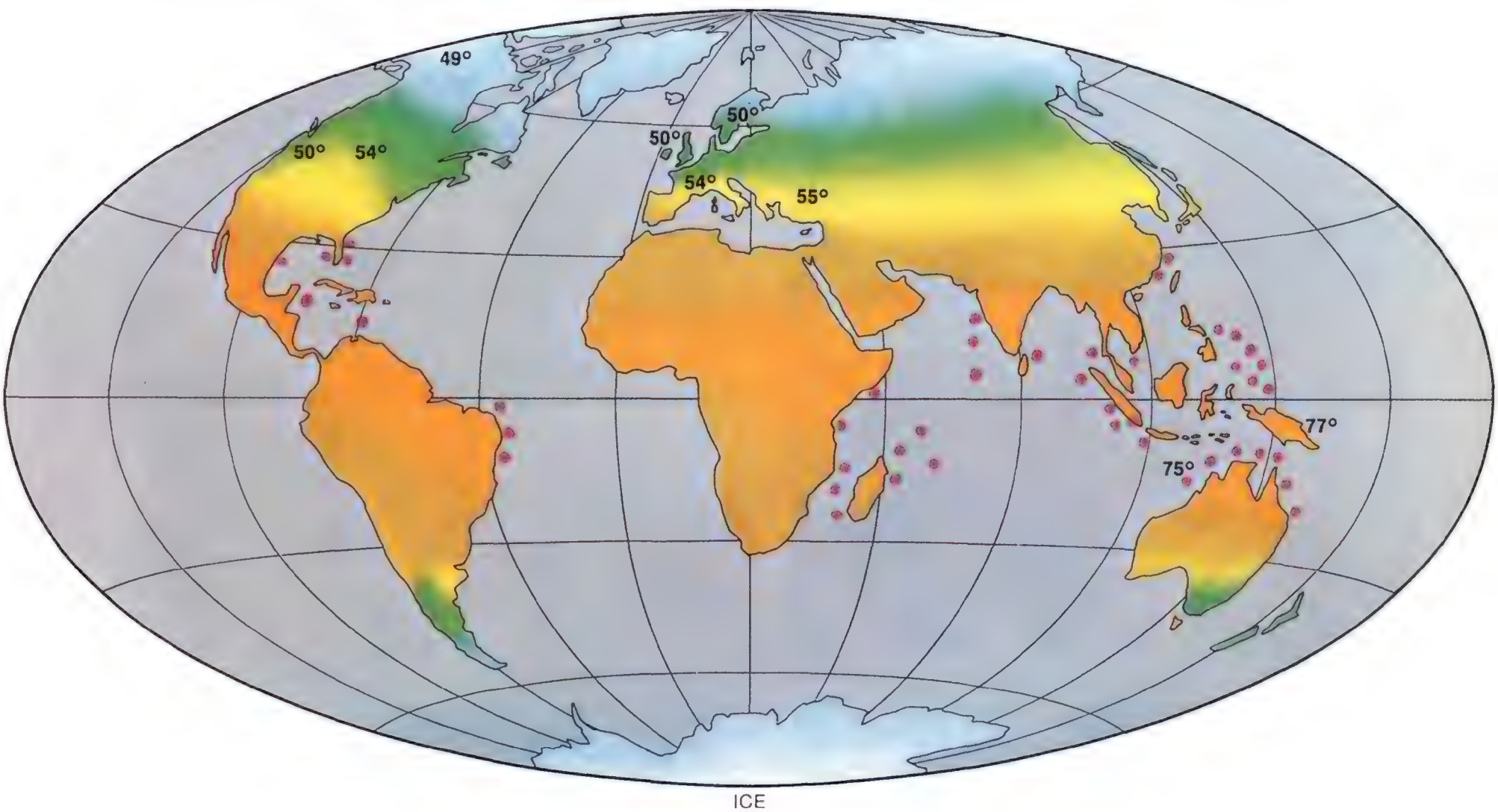
Cold cycles inhibit life

Mars is a case in point, apparently going through a completely frozen period every few hundred million years. While microbes might readily evolve on such a planet, it appears unlikely that substantial, water-dependent and water-composed beasts capable of technology and perhaps Earth-type intelligence would arise. Because of the meteorology of planetary climates, a small investment of solar change can cause a radical change. If supposedly stable stars have flickered and caused radical changes on their hypothetical planets, the nearest technical civilization could be many hundreds more light-years distant from us than has been estimated in recent years.

A final speculation follows at once from the theory that extra radiation can cause Mars to "flip" from its present cold state into an alternate, temperate state. This speculation, developed by Joseph Burns and Martin Harwit of Cornell, could reduce Sierra Club lawsuits and Alaskan pipeline battles to the status of parlor chitchat. The idea is that humanity, by shifting asteroids or Martian moons, might alter the motion of Mars, thus changing the heat received by its poles. This would melt the polar caps and alter the entire Martian environment. If recent theory is correct, such engineering could convert Mars to a more livable climate, ready for our first moves out from Earth.



Earth maps for 135 million years ago (above) and today show planet-wide temperature differences. Tints from red to yellow to green to blue denote progressively cooler temperatures. In map above there is no ice at poles and coral formations (red dots) are 20 degrees farther from the equator than today. Temperatures (numerals) were clearly warmer then. It takes more than continental drift to account for these differences.



Landowners whose homes would be flooded gather for a protest rally at the planned dam site. One of their leaders boasts that he can assemble 30 neighbors at his place within ten minutes.

By Alton Marsh

Daniel Boone's wilderness may be tamed by a lake

With time running out, bitter homeowners and conservationists are suing to forestall Corps of Engineers' dam in Red River Gorge

"I don't feel like I'm going to leave. I'd rather die," said Jimmy Skidmore, his usually ruddy, cheerful face clouded with anxiety.

Jimmy Skidmore is anguished because his modern brick house sits on the spot where the U.S. Army Corps of Engineers would like to place an 1,800-foot-long earthen dam.

The Corps sees the steep canyon walls of Kentucky's Red River Gorge as a natural reservoir for water impoundment. Present plans call for a 141-foot-high dam that would slowly begin to create a lake covering 1,500 acres, and the impounded water would back up 15 miles along the Red River (one of a number of rivers in the United States with the same name).

When the current $34.1 million project was authorized by Congress in 1962, the Corps proposed placing it in the narrow valleys of the heart of the gorge, in what the U.S. Forest Service calls the "geological area," where 84 natural rock arches have been sculpted from an ancient seabed over a period of 60 million years. Public opposition forced a move in 1969 to a site in a wide farm valley just below the gorge.

Despite the lapse of years and change of site, public opposition to the dam is as intense today as it was in the late 1960s. In fact, it is now the basis for a legal battle. The Red River Gorge Legal Defense Fund is suing the Corps on behalf of Kentucky chapters of the Audubon Society, "Save our Red River," the Sierra Club and individual landowners. With an injunction currently holding up construction of the dam, the

After canoeing and scrambling up rocks, campers prepare for a night in the roughs of the North Gorge.

case is now before the U.S. District Court in Louisville.

In recent months, environmentalists from 18 states have pledged their support to the Defense Fund. Some 44,000 people, mainly from Kentucky and southern Ohio, have signed petitions against the project for presentation to Kentucky Governor Julian Carroll. Two thousand people have marched on the state capitol in Frankfort in a peaceful protest. The U.S. National Park Service has proposed a "natural landmark" status for the gorge, declaring it one of the finest examples available of geological and ecological resources in the Appalachian Plateau.

But, undoubtedly, the most heartfelt of the opposition comes from Jimmy Skidmore and 54 of his neighbors, whose homes would be removed to make way for 60 feet of water behind the dam.

Jimmy is a relative newcomer to the valley, his family having arrived only 100 years ago. Most of the valley residents are descendants of settlers who came around 1800, about the time Virginia's Governor Patrick Henry made a private land grant of thousands of acres in the gorge. Included in that tract is the small farm belonging to H. B. Farmer and his wife Tressie.

"When something like this comes to destroy you, you have to go all out," Farmer said recently. So he made the supreme effort. At age 70 he bought his first typewriter. "The dictionary burned in a house fire in 1944," explains Farmer, who had never found it necessary to replace it. He has only a few years of schooling, and must look up words he wants to use by reading through newspapers and magazines. It takes a long time to complete one of the letters, but Farmer has now written more than 300. "This is Eden," Farmer said one day, motioning toward a brook behind his home where dogwood blossoms were reflected in the ripples.

The Red River Gorge is located along Mountain Parkway, 70 miles southeast of Lexington, within the Daniel Boone National Forest. It was in this wilderness 200 years ago that Boone discovered "nature was a

Alton Marsh, former science writer for the Louisville Times *and now with the* Lexington Herald-Leader, *has frequently covered the Red River Gorge dispute.*

Location of petroglyphs, such as the one shown above, is kept secret to protect them against vandalism.

series of wonders, and a fund of delight. Here she displayed her ingenuity and industry, in a variety of flowers and fruits beautifully colored, elegantly shaped, and charmingly flavored; and we were diverted with numberless animals. . . ."

Visitors today are no less charmed by the haunting beauty of white water, stands of tall timber, the multicolored carpet of gentians, Dutchman's-breeches, cardinal flower, Indian pipe and trout-lily, viewed from such vantage points as "Angel Windows," "Cloudsplitter Rock" and "Pinch-em-Tight Ridge." To many people, preservation of this "little Grand Canyon" of the East is a must.

Everyone knows the environmental effects on the gorge would begin to be felt as soon as the Corps moved in the first bulldozer. Some wildlife, including raccoon, gray squirrel, deer, grouse and beaver, would be frightened away by the noise of construction. They would flee to join wildlife in neighboring habitats, resulting in overcrowded living conditions that would soon exhaust the food supply. Some will die, according to Corps documents, including a unique colony of corn snakes.

The overall character of the geological area, where 763 species of plants have been found—including 14 that are rare and endangered—would begin to change. Forty-seven plant species, including four known nowhere else in Kentucky, would be flooded. At one point in the gorge a rare association of beech, sycamore, tulip poplar, hemlock, basswood, sugar maple and other trees would be killed.

"I think there will be a change in plant life," Colonel James Ellis, Army Corps district engineer, said in an interview in his Louisville office. "I don't know if that's for the better or worse. You might find out 15 or 20 years from now we have a hardier, more attractive plant life down there."

When Dr. Mary E. Wharton, retired after 27 years as head of the biology department at Kentucky's Georgetown College, heard about the colonel's comment, she replied, "Botanists, however, think the present, uncommon plant species will be replaced by the more common box elder, willow and poison ivy."

Botanists from many Kentucky colleges now use the gorge as an outdoor laboratory. But its value in that capacity would be greatly diminished by the dam, according to Dr. Wharton and Dr. Roger W. Barbour, a biologist at the University of Kentucky. The wide range of habitats, from moist valleys to the dry ridges, provides a diverse environment capable of supporting numerous species. Drs. Wharton and Barbour have taken classes to the gorge for 25 years, and they have co-authored two popular reference books—*A Guide to the Wildflowers and Ferns of Kentucky* and *Trees and Shrubs of Kentucky*.

Geology students also find the gorge an exceptional learning area. University of Kentucky Professor Carl M. Clark has termed it a "geological art gallery." The arches such as the popular Sky Bridge, high on the point of a ridge, and Gray's Arch, large enough to hold a moving van, are spectacular enough, but deep

Aerial view shows some of 1,500 acres of farms and forests that would be inundated by reservoir.

in a seldom-visited portion of the gorge is an "arch within an arch" formation. Called "Cherokee," the 90-foot-long natural bridge was formed inside a huge cave or "rockhouse." It is 50 feet high and seven to eight feet thick. While the arches in the upper gorge would not be flooded, it is the overall change in the character of the whole area that Kentucky scientists fear. One special concern is that the valley floors in the geological area may become mud flats.

Archaeologists have clearly identified signs of prehistoric Indian cultures—Archaic, Woodland and Fort Ancient—in the gorge area. It is estimated by Wesley Cowan, University of Kentucky field archaeologist, that 31 of the sites left by these cultures would be inundated by the reservoir. (The Corps says federal funds would be available for an archaeological excavation before the waters come.)

The Indians left possibly more petroglyphs in the gorge than anywhere east of the Rockies, with the exception of Missouri, the U.S. Forest Service reports. The locations of the petroglyphs are closely guarded secrets of the Forest Service, to protect them from the kind of defacement seen at Sky Bridge, where the upper surface is covered with initials and a "peace" sign. (It has been a violation of federal law since 1903 to damage any prehistoric remains.)

Corps officials repeatedly remind the public that they have a "mandate from Congress" for the dam project. Unless Congress changes its mind, they make it clear that they plan to proceed with preparations for construction.

Their justification for the dam is based on several claimed benefits. The strongest of these is that the dam will reduce flooding at Clay City, a community of about 1,000 downriver from the dam site. Yearly floods often damage crops in the area, but the last serious one affecting the town occurred 13 years ago.

Opponents point out that the dam controls only the North Fork of the river, and that flash floods could still occur at Clay City from the Middle and South Forks. The Corps admits this, but says its project was never meant to stop flooding—only to reduce it. A flood so serious that it can be expected to occur only once in ten years or more will thus affect only 4,500 acres, not 7,200 as at present, the Corps says.

Few farmers take out flood insurance

Defense Fund Attorney Oscar Geralds charges that only 87 homes in Clay City have ever been damaged in any way by floods in all the years since records have been kept. "This area has been farmed successfully for 200 years, and not many farmers have ever felt the need to take out flood insurance," he says. He believes in flood-plain zoning as an alternative to the dam, restricting private structures to areas that are not flood-prone.

Some skeptics doubt the ability of the Corps even to construct the dam properly, let alone reduce flooding once it is completed. They point out that a dam built on Wolf Creek at Lake Cumberland in southern Kentucky is leaking. Now under expensive repairs, it is of the same construction as the dam proposed for Red River Gorge (a Corps spokesman said that Army engineers have learned a thing or two about construction of earthen dams in the 20 years since Wolf Creek was built). But another, Fishtrap Dam near Pikeville, Kentucky, is filling with silt and debris at a rate 6½ times faster than Corps engineers expected.

Even when built properly, the operation of Corps dams during late winter rains can cause problems for persons living nearby. Residents of the tiny Kentucky communities of Hell for Certain and Confluence found their towns aptly named this year. They were trapped on hilltops for several days by large releases of water from Buckhorn Dam, built by the Corps to protect them. In western Kentucky, fields were flooded by similar releases from the Barkley Dam.

"When God sends a flood, He generally sends it be-

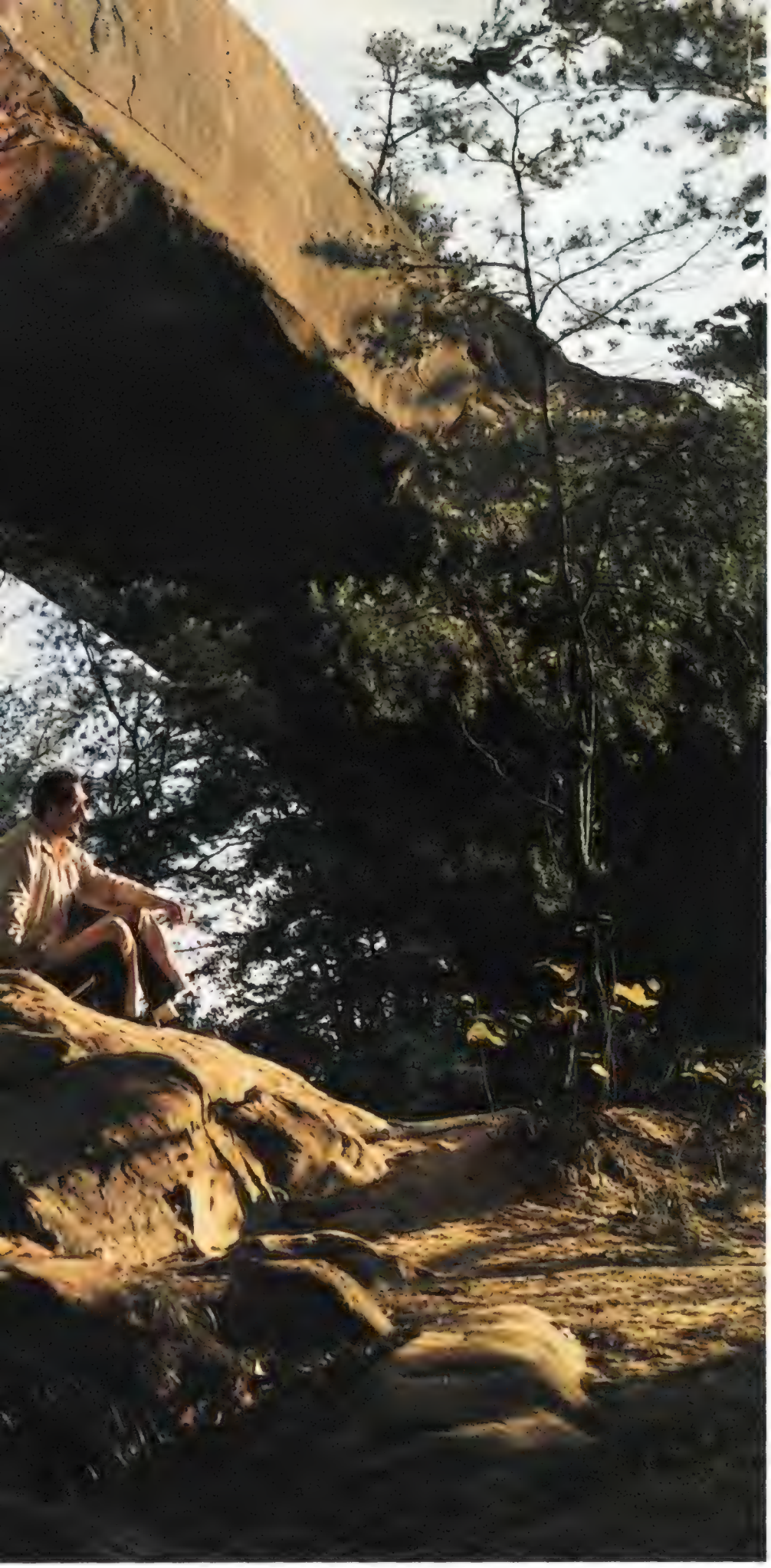
fore the crops are planted," Geralds notes with a twinkle. "When the Corps sends a flood, they send it on top of the crops."

Several problems have arisen with a second benefit claimed by the Corps: the use of the reservoir as a drinking-water supply. Ten of the 12 cities designated by the Corps as beneficiaries of the supply have stated they do not want it. And the Environmental Protection Agency (EPA) has warned that the water will violate the National Technical Advisory Committee standards for iron and manganese during autumn months. The manganese will create taste and odor problems, and the iron will stain laundry. Ellis says water-treatment plants can eliminate the water-quality problem, but that will make water produced by such plants expensive. The EPA states that the reservoir water may rust pipes of the treatment plants, resulting in higher costs that must be passed along to the consumer. Also, there is likely to be violation of dissolved oxygen standards in summer months owing to temperature stratification in the reservoir. If the oxygen-depleted water is released, it might threaten fish life downstream from the dam.

Heated debate has developed over a third benefit: improved recreation in the gorge area from boating and fishing. The Corps would ban gasoline-powered boats from the reservoir in order to preserve the character of the area as much as possible. Although the gorge now attracts a million visitors a year, Corps figures project an additional half-million annually within three years after completion of the project. A forest ranger said the gorge is already suffering adverse environmental effects. "We're saturated now! We've already loved the gorge to death," the ranger said. "There's no way we can handle it."

As a fourth benefit, the Corps has suggested that economic growth will be spurred on land protected by the dam. But such growth will be limited by the National Flood Insurance Act of 1973, which Congress passed to restrict growth on floodplains. It requires local communities to zone flood-prone areas as "off-limits" to development. Without such zoning, developers will not be able to get flood insurance and bank loans for construction.

Popular Sky Bridge is not endangered, but damming waters below could slow formation of future arches.



Still, the dam might free 200 acres near Stanton, Kentucky, that would be usable for housing development, and one real estate broker estimates that farmland worth about $750 an acre now will increase in value to about $6,000 when sold as lots for homes.

To justify the project to Congress, the Corps was required to calculate a "cost-benefit" ratio. It determined that for every unit of cost the Red River dam project would return 1.7 units of benefit. Inflation has raised doubts among dam opponents that the figures used to justify the project when it was approved by Congress are still accurate. When the project's costs were totaled, the interest rate for construction money was only 3⅛ percent, a rate far below what it would be at the present time.

"It is my professional opinion that, given careful and competent calculation, the benefits of the project would not exceed the costs," wrote University of Kentucky Professor Alan Randall, a specialist in agricultural economics, in a letter to the Council on Environmental Quality. (The Council on Environmental Quality has criticized the Corps' environmental analysis and advised against proceeding with the project as it is now described.)

"I don't know that it would be a less than one to one ratio," Ellis says. "Your crops will go up [the value of crops protected by the dam]. The value of homes in the area, I suspect, will go up." When Ellis was asked a second time if there was a possibility the new ratio might fall below justification for the project, he thought a minute and answered, "I don't know."

Speak up or let Corps "grind it up"

A number of widely known persons have been associated with this wilderness dispute since it first surfaced with an editorial in the Louisville *Courier-Journal* in 1965. Among them is Supreme Court Justice William O. Douglas, who came to the gorge in 1967. After a hike along what is now known as the "Douglas Trail," the strong-willed justice emerged from the craggy slopes into the lights of national television news cameras to advise the public to either make its wishes known or let the Corps "grind it up."

Major General John W. Morris, director of civil works for the Corps, recently made this judgment: "We've come down to the bottom line as to whether this project is in the national interest or not, and after very careful evaluation we've concluded that it is."

For both the advocates and the opponents, the months of decision are at hand. The issue seems to be whether to bend nature to man's will or try to live in communion with it. The gorge will either become another site of questionable "progress," or it will remain, as it is now, a largely unique wilderness area. Red River is still creating new arches and rockhouses for persons to enjoy a million years from now, but that work will be disrupted if the flow is slowed by the dam. Red River Gorge has clearly been at the fulcrum of a change in the public's awareness of natural values, but it is questionable whether the change has come soon enough to save the gorge.

Sunlight streams through overhanging cliffs
in the rugged upper-middle of the gorge.

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By David Nevin and students of Dwight-Englewood High School

Theme: *What we did on our vacation*— Trading culture with Romanians

Four groups of young Americans sang and danced through Romania this summer, to their delight and that of their hosts

The Tarom Airlines 707 touched down at Otopeni Airport at Bucharest some ten hours out of New York. "An Iron Curtain country!" 14-year-old Staci Paley noted in her diary. She was one of a troupe of 24 youngsters from an Englewood, New Jersey, high school who—with three other groups—were embarked on a three-week singing tour that would cover most of Romania.

They arrived excited and exhausted, having laughed and sung through a night that lasted only three hours on the east-bound jet, and were sobered immediately by the sight of armed soldiers. "It was raining," Wendy Streeter wrote in *her* diary, "and there were guards armed with machine guns keeping watch, to our apprehension." It was "pretty scary," Jane McDonald observed, "but I find the whole image around communism pretty scary. I want to find out more about it."

The inside of the terminal, Tina Fein thought, looked like the airport at Newark before it was remodeled, except, of course, there were the apparently omnipresent guards and machine guns. An official gave them brusque orders, "unintelligible but seemingly menacing," Wendy Streeter thought.

So it was good for international relations when they entered a big room where a choir from a Bucharest conservatory pressed long-stemmed carnations on them, pressed kisses on their cheeks and greeted them with a soaring song of welcome. "Enough kisses," Lisa Diaz wrote, "to make us feel loved for the rest of our stay." She added a professional note: "The choral group that sang us a welcome made me green with jealousy because they were phenomenal!"

That night, after scarcely a moment to rest, they were taken to an open-air reception and dinner at which a splendid Romanian orchestra played. "There were 8 or 10 violins," Andréa Moss wrote later, "a man who constantly changed flutes, an accordion and two instruments I don't know, one related to a xylophone, the other a woodwind, but must have more than meets the eye because what he played was impossible. He played *so* fast. The orchestra also played bird calls."

Later they were introduced to an old Romanian custom—the *perinița* or kissing dance (opposite), which Wendy Gordon quickly perceived as "the greatest tradition!" It began as a circle dance, Andréa Moss explained in her diary, "where one person in the circle picks a mate from the circle, puts a napkin around their neck and pulls them in. Then they kneel on the napkin, kiss, and the first one joins the circle. The second one picks a new mate. It was a lot of fun."

This, said Carl Woods, "was our first lesson in international diplomacy, that a smile and a kiss mean the same no matter where you are. The Romanian people are much friendlier than we are." The ice was broken, the alarms forgotten and the tour was going to succeed. "Everyone at home is going to be surprised," Crystal Brown wrote, "when they see how much I've changed, I'm going to change, to grow, to mature. I can tell."

The Romanians who introduced the Americans to such a charming custom were part of a group of 75 singers and folk dancers who had toured the United States for three weeks in the spring of 1975 and had

Rutgers student gives ancient folk dance Yankee approval by kissing Romanian partner on lips.

Photographs by Ralph Crane

Costumed village girl extends cordial welcome to American visitor with traditional offering of bread and salt.

Asher dancer Wynette LaBrosse coaxes shy Romanian girl to twist during "Greasy Slicks" routine.

Conservatory students surmount language barrier, speak to Amy Markarian (foreground) in French.

ended in the White House with a concert for President Ford. Now, in the summer, the Americans were returning the call.

The Romanian tour had resulted from the efforts of a nonprofit organization in New York called Friendship Ambassadors which is run by an evangelical promoter of international friendship named Harry Morgan. Morgan, who is 41, began what became a career at the age of 19 when he traveled to the Netherlands to help repair flood damage. Soon he arranged for a couple of Hollanders, whose views of America he thought distorted, to come to this country to see it more fairly. This led in turn to a program of national tours for foreign students already in the United States.

Friendship Ambassadors began with Morgan's realization that young American school musical groups, often of near-professional quality, would be attractive apolitical visitors to Iron Curtain countries. The Czech government was interested, and so in 1971 Morgan sent the first group of singers abroad. Romania liked the idea, too, and soon groups were going there, as well as to Poland. The students paid a reduced cost ($619 per student in the case of the New Jersey group), the host government absorbed many of the tour costs, and Morgan's organization used donated funds to expedite the whole affair. By now more than 7,000 American students have made the tours. Last year Romanian President Nicolae Ceaușescu heard an American performance and offered to send a group. The Romanians played the United Nations in New York and toured 30 cities in three weeks. The Englewood students and three other groups traveling to Romania with them were counted as especially reciprocal. They were given wide exposure to youth centers and worker housing (Jane McDonald would get her chance to find out more about the system) and ended their tour in a performance for and meeting with President Ceaușescu that paralleled in so many ways the Romanian meeting with President Ford.

American groups apply for the tours by submitting audition tapes. That's how the choir of the Dwight-Englewood School, a private co-ed high school in Englewood, N.J., was chosen. The choir included 19 girls and five boys, among whom were ten who played the English hand bells, and a barbershop quartet. Joseph Erwin, musical director of the school, led the group and sang in the quartet; Mrs. Erwin and three chaperones went along.

The other groups making up the total tour were the Rutgers University Glee Club, the Arkansas State University Male Chorus and the Asher Troupe of Michigan State University.

The four groups played three days in Bucharest and then toured the country separately. The New Jersey youngsters traveled in a bus and saw a spectrum of Romanian society ranging from rural villages to cities. They spent time in the mountains, among young Romanians who were hiking through the summer, and went on to a Black Sea resort reserved for young people —no one over 30 admitted. The tour ended with the presidential visit.

But the real sense of the tour lies in diary entries

A spellbound Lereşti child has catbird seat on Andréa Moss's lap during Rutgers performance.

Lynne Gordon tries on hostess's hand-embroidered bridal veil in home where she spent a night.

Arkansas Male Chorus diverts hosts with repertoire of spirituals, Stephen Foster and Old West tunes.

made under the pressures of time and disparity of cultures. "I don't know when I'm going to get some rest," wrote Crystal Brown, "but I don't care anymore. There's so much to do and I want to see, taste and do everything."

After breakfast of hard rolls, butter, preserves and weak tea, they were off to see Bucharest. "Our guide, Miky (short for Mihaela), showed great pride in the construction," Wendy Streeter wrote. Tina Fein thought the new buildings looked like Miami condominiums from a distance, and noted in her diary: "Poplar trees all over, lots of gorgeous guys, soldiers everywhere; just saw a man in the middle of town with a horse and wagon."

That afternoon they jammed into Music Director Erwin's hotel room for rehearsal. Wendy Streeter wrote they "discovered our religious music could not be used—socialist nations are atheistic in philosophy."

That was a blow, for unlike the other troupes which specialized in lighter music, the choir's repertoire stressed classical and church music. "We cut all we could," Wendy wrote, "and to my personal horror, adulterated e.e. cumming's 'i thank you god' to read 'i thank you life.'" Stefan Bucek was blunter. "That really stinks," said he. "The youth organization is afraid that the government might take offense. I can't see it. We have only good intentions."

Then on to their first performance. Nervous, feeling under-rehearsed, "we filed into a crowded hall and sang," Wendy said. "The result was maybe not quite what we had hoped for, but the applause was enthusiastic. True, it was more so for the groups which had preceded us and followed us."

The Rutgers group, all men in bright red coats, was a typical glee club, strong on college and drinking songs. Arkansas also was a male chorus, stressing traditional American music and spirituals, while the Asher Troupe from Michigan State, men and women, was oriented to production numbers, including a pop music survey from the 1700s that ran through an enthusiastic Charleston right up to an impression of the greasers of the 1950s and pop tunes of the '60s and '70s.

The crowded schedule sent them to a Bucharest high school, or lyceum. The students were lined up outside and as Charles Giancarlo approached they broke into cheers; he had been nervous and this encouraged him. "This was the best part of the trip," he wrote later. The students were holding flowers, Wendy Streeter noticed. "As Mrs. Erwin said again, 'Look into their eyes! Smile!' We did so and I immediately caught —and could not lose—the eye of a young man near the bus. When we walked up the drive to much applause he stepped forward and gave me his red carnation. I was completely touched."

The concert was a great success. The choir quickly formed the habit of opening with the Romanian anthem played on the English hand bells. The bells are popular in the United States, but apparently have not yet penetrated Romania. They brought down the house every time.

The schedule pushed them on relentlessly. "I had the feeling we were being herded about," said Lynn

Barbershop quartet (Englewood) pleases peasant women by singing "Yes, Sir, That's My Baby."

Joe Erwin leads bevy of bell ringers at Turnu Severin. Lynne Gordon and Mrs. Erwin (right) sub for ailing

Gordon, a former member of the choir and now a graduate student along both as singer and chaperone. "The language barrier was quite real, even with our interpreter. Few thought thoughts except of confusion." By this time photographer Ralph Crane had flown in to join the Englewood troupe; when the youngsters found Crane had been born in Europe, they quickly pressed him into service as an interpreter.

The loss of their religious music continued to distress the choir. " 'Soli Deo Gloria' is 'Sing We to You, Joyfully,' " complained Andréa Moss. But one afternoon they drove in the rain to an ancient monastery where, Wendy Streeter said, "the ceilings were high and vaulted, and like the walls, covered with murals in beautiful rich colors and gold leaf depicting various saints and biblical scenes. We gathered together and sang 'I Sing of a Maiden,' 'Adoramus te,' 'Alleluia' (Randall Thompson) and 'Soli Deo.' We were stunned as we heard the echoes die away."

The building is famous for its acoustics, and Andréa Moss thought the echoes lingered five seconds or more. "I could feel tears rushing to my eyes," Amy Markarian wrote. Wendy Gordon added that "the notes floated up into the arches and just rang out in echoes over and over again into infinity. It was so beautiful that it brought tears to my eyes." Photographer Crane said most of the choir cried at this moment, and so did he.

At the town of Pitești, the choir gave a concert at the Communist Youth Center, a surprising structure of which the hosts were very proud. It was, said Wendy

player. Switching bells in fast-paced, three-octave pieces demands intense concentration, nimble hands.

Streeter, "an incredible work of modernistic interior decoration, from the lighting effects to the mirror-ceilinged booths in the bar to the globelike suspended chairs with stereophonic earphones. It was here that I met Jenica, who immediately took my hand and attempted to speak to me in French. We sang and rang and gave the first full-scale barbershop performance, with vests and straw hats. We were warmly received."

There was dancing afterward and Andréa Moss expected folk dancing, "but it was just horrible rock dancing. I left with a Romanian girl, Shani. I met her father and listened to folk music in one of those chairs. When we returned to the dancing they were doing the kissing dance again. I kissed 5 or 10 guys and wandered around with Shani."

"I played guitar for two hours," Staci Paley said. "I was feeling very happy." On the dance floor itself, international friendship was suffusing Carl Woods: ". . . Smiling faces, illuminated by red, blue and gold rays of brilliance. An expression is caught by a strobe and then lost forever. We forgot our differences and became one. No longer representatives of different nations, just young, loving people. Political differences no longer exist. This can never be done by most adults because they are mature enough to know that one cannot trust anyone different from oneself."

All the choir members felt under pressure, as if they were herded and regulated, watched and guarded, perhaps for their protection, perhaps to insulate them from the people they had come to meet. "Is it a terrible thing to take a picture of a soldier?" Jane McDonald

Flashing broad smile, villager dons Director Erwin's straw boater, floating atop her *naframa*.

wrote. "Would he shake his head no and point his gun?" She had opened the trip wanting to know more and she ended it confused, feeling that the youth center and her hosts had been selling her. "Too tired to write anymore. So many questions unanswered. . . ."

Lynn Gordon felt she never got close. "I felt as though I was something special from the 'outside.' Just as I now want desperately to see *The New York Times*, they seem to want to know what we do, how we happen to be here, about our clothes, how much money we make, how much this or that costs." Welcomes have been warm, "always with flowers and kisses. They are very affectionate or perhaps they simply demonstrate more openly. We are trying to live for awhile in a society that seems to me to be confusing. As the church is only partly its own master here, so it seems are many of the people. I feel though we've met them and kissed them, I am still very much an ambassador, not a possible friend."

One morning they set out on the bus for the mountain village of Lereşti, feeling time-pressed as usual. In the village square they were met by the Romanian Orthodox priest, the Reverend Stelian Suseanu, who kissed everyone on both cheeks. "Then a girl came with beautiful bread and we took a piece, dipped it in salt and ate it," Andréa said. "Someone gave us plum brandy. Little children gave us flowers." After eating the bread and salt, Stefan Bucek said, "we drank out of a wooden canteen which was filled with plum whiskey. I was not expecting that and, thinking it was water, gulped it down ravenously. I later paid for it."

Two years earlier, Harry Morgan, the founder of Friendship Ambassadors, had been married in this church by Father Suseanu and now he and Cappy Devlin Morgan planned to reaffirm their vows in another ceremony (pp. 74-75). "The church was small and ornate," Wendy Streeter said, "and the priest was robed in gold. The Morgans were in Romanian folk dress, except for Mrs. Morgan's high heels." As the choir watched, the priest conducted the ceremony, at one point covering the Morgans' heads with his voluminous robes. "We did a few of the sacred songs that were forbidden elsewhere," Wendy said, "and were greeted with applause, to my consternation."

That night choir members slept in village homes, an unusual event since the Romanian government dis-

courages unguarded relations between its people and visitors. The Americans took in stride the outhouses and having to walk among barnyard animals to reach them. Many of the choir members got sick later, possibly from the chill night or the water from a well across the street or exhaustion—or all three.

Wendy Gordon was delighted with the experience. "The house was beautiful. Everything was handmade —the rugs, bedspreads, tableclothes, everything. I especially loved the walls, pastel colored and handpainted with floral designs. The grandmother came to visit in full traditional attire."

Actually, there was little substantive communication between hosts and guests, but the language of affection seems to have bridged the gulf. "All it took was a kiss from the mother of my family when I stepped off the bus and I knew everything would be O.K.," said Jane McDonald. "Eugenia (the mother) makes you feel so at home," Crystal Brown said. "I miss my home." When they left the next day, the people seemed grateful that they had come, "but not as thankful as I for the little taste of home they gave me," said Crystal.

Wendy Streeter thought their next concert was their best. "We received the largest ovations ever and several encores from the full house, though I think the last was prompted by Mr. Crane's feat of climbing onto a stepstool at the front of the stage for a photograph." Nevertheless, what with illness and irritations, this was the tour's low point, "and to make matters worse," Wendy wrote, "this was Mr. Crane's last day with us. We will miss him immensely." The ever-cheerful Crane, in addition to photographing the choir, had quite won their affection, and they repaid him in the coin of their own skill.

"Last night we learned Mr. Crane would have to leave us tomorrow," Crystal Brown said. "We stayed up just about all night making up a song for him. We sang it to him tonight in the stairwell of his floor. I hope he liked it. I think it went quite well. . . ."

It was an adaptation of Thomas Morley's intricate five-part madrigal, "Shoot, False Love, I Care Not."

Shoot me, Ralph, I care not
Spend thy film and spare not.
  Click click click click click click click . . .
Long thy smile did cheer me
While the crowds did "jeer" me.
  Click click click click click click click . . .
You'd blind me with your lights
Atop amazing heights.
As long as we're performing,
The cameras round us swarming,
So highly we esteem thee
As one of us we deem thee.
  Click click click click click click click . . .
But now we do perceive
That you will have to leave,
And every choir member
Will be grateful in September.
So weep we all in sorrow
To say goodbye tomorrow.
  Click click click click click click click . . .

And Crystal Brown added, "I did a stupid thing tonight. I cried when we sang. I hope it didn't make him feel bad."

Nicolai Balcescu High School gymnastic dancers honor visitors by forming official Olympics symbol.

Asher Troupe (Michigan State) shakes legs for Romanians in spirited Charleston in Bucharest.

Renewing marriage vows in Leresti's church, the Morgans and Father Suseanu hear the Rutgers Glee Club sing Beethoven's "Of God I Sing"

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The collection begins with "The Patriot," who sets aside the task of clearing his land to fight for it with valor. The sculpted detail is so fine that you sense the quickly forgotten plow as he grasps his rifle to run to the call for arms.

Second in the collection is "The Navigator," capturing the spirit of the gallant Americans who conquered the farthest reaches of the sea. Sextant in hand, he plots a course for other seamen to follow, launching the great tradition of American seamanship.

Every bit as romantic in this tradition is "The Railroad Man." Through the historic driving of the Golden Spike, he linked America together, in fact as well as in spirit.

As the collection unfolds, it pays artistic tribute to "The Newspaper Man" who closed the communications gap across America . . ."The Plainswoman" without whom the land would never have been settled . . ."The Blacksmith," hailed in poetry and song as he forged the tools and shod the animals . . ."The Schoolmarm," bringing the touch of learning to the youngsters who labored with their elders to forge a new nation.

Extraordinary and Authentic Detail

From conception to creation to actual casting, no effort has been spared to assure complete and total accuracy. Researchers, artists and sculptors pored through galleries and archives, searching out the most minute details. The Navigator's sextant and his unusual shirt . . . the odd hat and boots of the Railroad Man . . . the crude handmade plow or the carefully coiled rope . . . all speak eloquently to their extraordinary detail.

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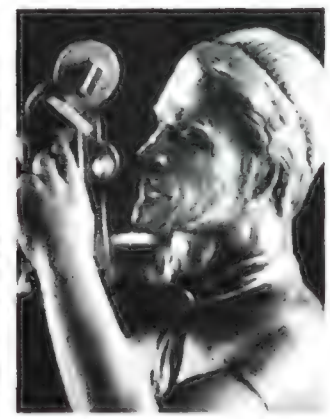
Since colonial days, pewter has been one of the most favored materials of metal workers and artisans because of its fine patina and remarkable durability. But, as with any metal, there are many grades.



THE PATRIOT

THE RAILROAD MAN

Sculptures shown smaller than actual size.

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The BUILDERS OF AMERICA collection will be issued in a strictly limited edition. The collection of twelve individual sculptures will be limited to a total of 5,000 in Fine Pewter. Registration numbers will be assigned in order of receipt of reservation.

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For the discriminating collector, 500 unique sets of the BUILDERS OF AMERICA collection will be custom-crafted in Solid Sterling Silver. These heirloom treasures in precious metal will be especially appropriate for those who cherish the work of the great colonial silverworkers.

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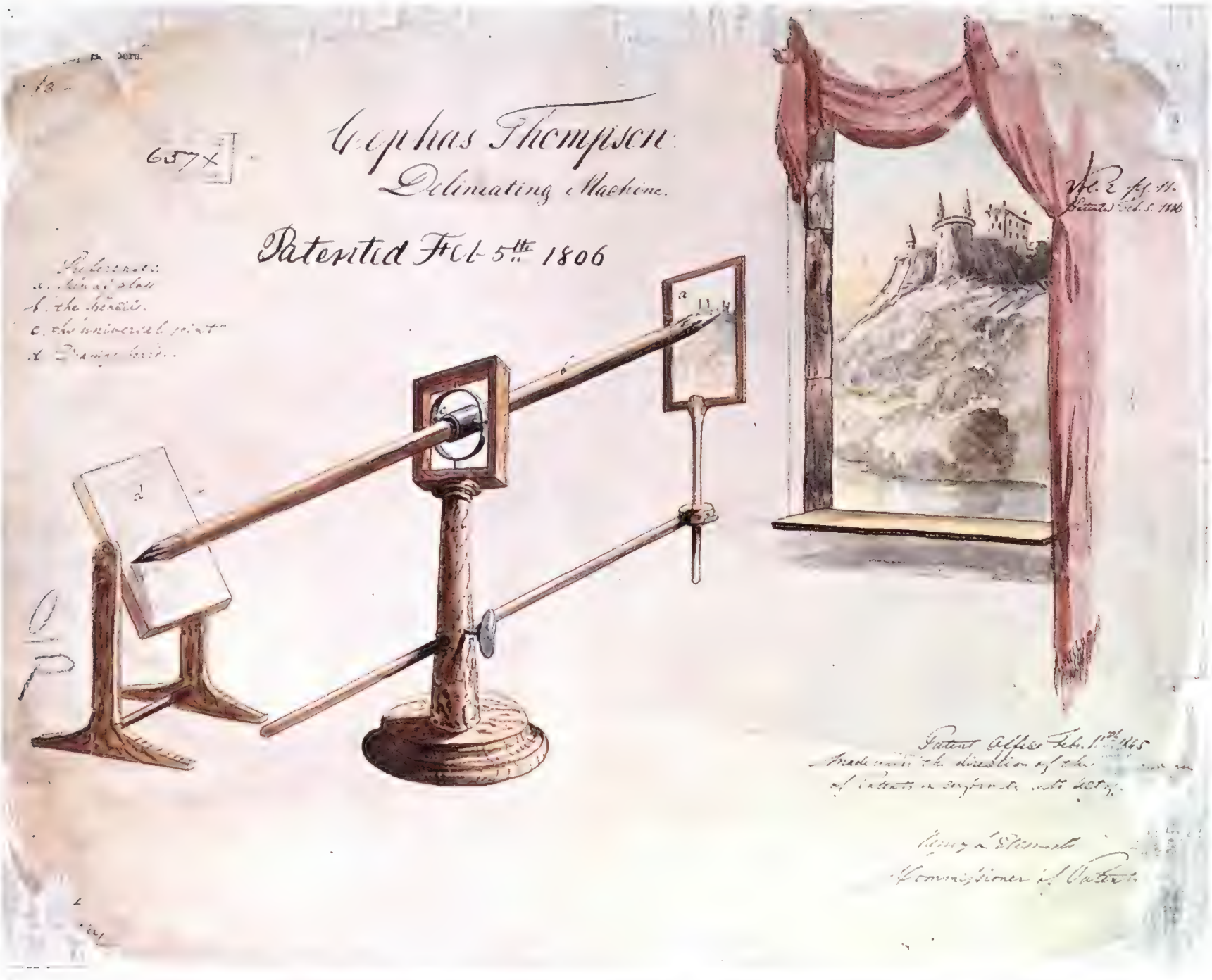


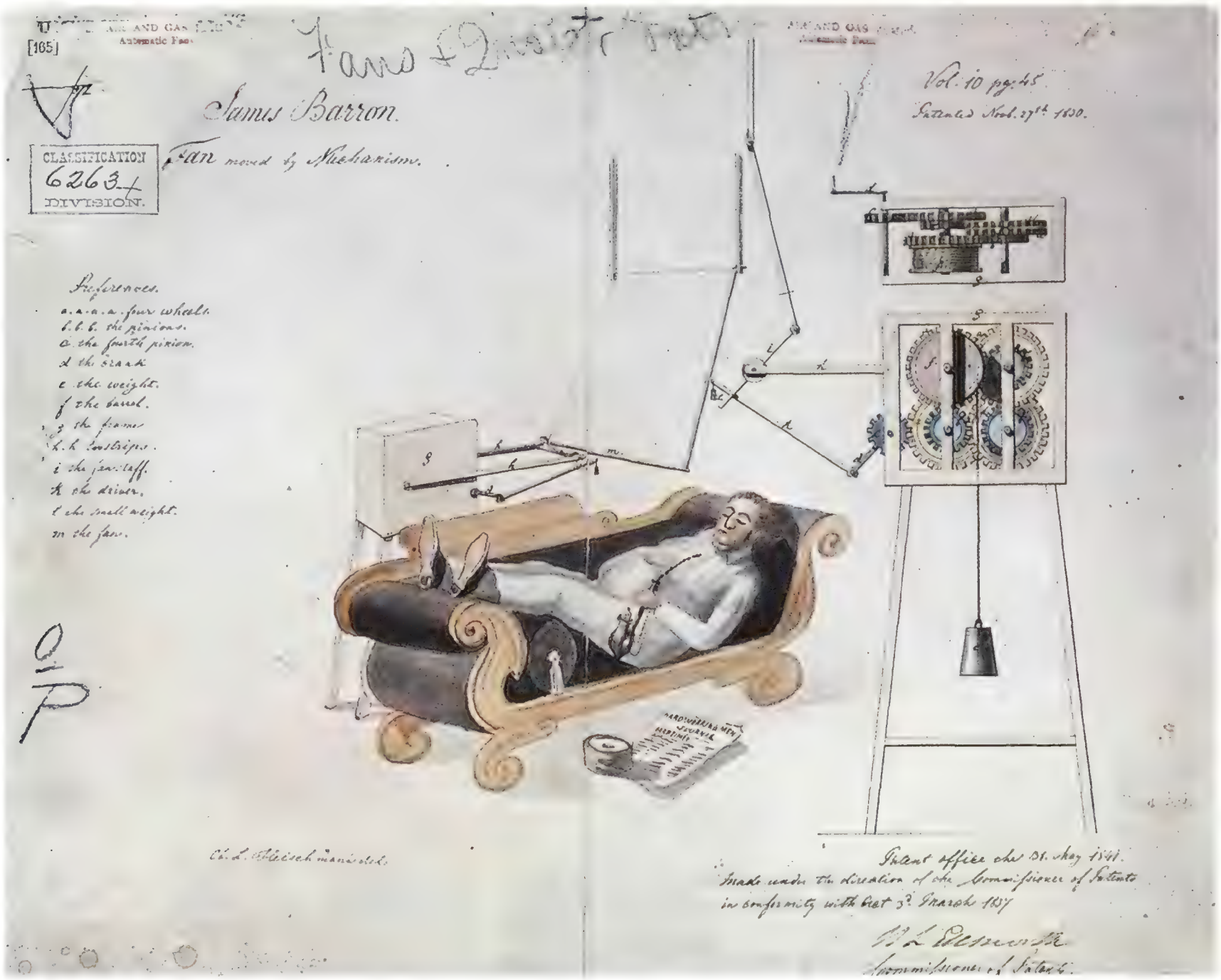
An unknown draftsman in 1845 delicately invoked the spirit and appearance of Cephas Thompson's *Delineating Machine*, patented in 1806, which was to be used for copying charts, landscapes and entire paintings or what have you. Thompson said his machine, based on the eye, would serve to copy "exactly from nature and all at such size as the pleasure of the artist may require."

By Peggy Thomson

Mr. Mudge's smut machine, et al

When fire consumed the nation's patent model collection, a call went out for artists to recreate them, for the record, in drawings

When Ebenezer Beard's beehouse went up in flames and a telltale smell of pine smoke—along with E. G. Pomeroy's boot crimp (which was superior for using clamps rather than pincers and tacks) and the smut machine of Canajoharie's Abraham Mudge and 10,000 other things—it was counted a national calamity. "All is gone," mourned the U.S. Commissioner of Patents, Henry Ellsworth, after the December 1836 fire, as though Americans would never rally to invent the plastic sandwich bag or the lunar landing craft. And no one seemed to think his gloom extravagant. All *was* gone that represented America's pride and the envy of the rest of the world—the proofs of American superiority in industry and ingenuity, all the documents, the models from a collection of 7,000 (SMITHSONIAN, April 1973) and the 9,000 drawings, including Robert



Only the plain truth of the matter could persuade anyone who can see that this is not a Rube Goldberg cartoon. It is, in fact, a rendering of a *Mechanical Fan for Bedchambers, Dining Rooms, Halls*, patented in 1830 by James Barron of Norfolk, the various parts of which, "united in their movements by periphery bands or cogged to run into each other," were devised to run eight hours.

Fulton's own watercolors of the *Clermont* steaming triumphantly up the Hudson. Nothing saved "to the value of a quill."

Congressional hearings, which never quite fixed the blame, did express regret about the practice of emptying ashes from office grates into wooden bins in cellars stacked with a winter's supply of fuel (though if witnesses whiffed *pine*, then the Post Office, which shared quarters in Blodgett's Hotel, was to blame, and not the Patent Office, which burned oak).

Yet Ellsworth rallied as did Congress. An impressive pile of a new fireproof building had already been authorized, six months earlier, to remedy the jumble of Patent Office effects "deranged," it had long been charged, "in their several parts." In a race to provide fit objects for this showcase, $100,000 was appropriated, which could properly go toward restorating on paper evidence of American genius.

Fifteen temporary clerks and draftsmen joined the staff, housed now in the Washington city hall, to copy out specifications and to draw anew all the lost items from the categories metallurgical, agricultural, chemical, calorific and pertaining to the arts (polite, fine and ornamental).

Within the first year, 2,000 patents were restored to view. There were more each year, but in 1840 they were removed to the new building, where, taking pride at the sight, a Philadelphia merchant wrote his wife he would rather, like Byron, have a nod from an American than a snuffbox from an emperor.

The work of restoration was never really finished; it just stopped in 1849. But part of the collection, some

What we have here is not a horseborne people-rocket-launcher but, of course, a saddle for invalids. Hezekiah L. Thistle made it up.

Richard Sealy's machine for destroying bedbugs called for steam—"the higher the temperature the more certain the effect"—as the active agent.

2,000 drawings, remains, stored today in ten large steel drawers in the impressive stacks of the National Archives. It provides, along with the 30 oversize ledgers of hand-copied specifications, an appealing record of a country's first half-century of button-busting progress in what it liked to call the industrial arts. And it reminds, through its neatly, in some cases elegantly, rendered machinery and its lively scenes of farm, canal, kitchen, sickroom or tannery, that this was a half-century which totted up progress in terms of stump extractors, spark arresters for chimneys and machinery for shaving barrel staves; in gins, gimlets, gunlocks, stills, waterwheels, washing machines, and churns; and in variations on the secret bedstead, which could look like a trunk in the stateroom but convert nicely by night to a bunk, thence to a lifeboat if the waters rose.

Some of the inventors' names live on in schoolbooks —Cyrus McCormick as reaper, Erastus Bigelow as weaver (whose forte before it was rugs was counterpanes). But surely not the rest. Their claims to remembrance depend on this early public-works-of-art project which, honoring them, captures a period even in its titles as well as in its pictures and text.

Consider, from a riffle through the bins, these items, the loss of which came close to justifying national despair: axle trees, scythes, sap buckets, sailors' shears, tailors' measures, footstoves, feather dressers, corselets for curved spines and machinery that would stiffen hat bodies or scald hogs or spread mustard plaster.

Washington free-lancer Peggy Thomson has written for SMITHSONIAN *on such diverse subjects as White House toys, freeze-dry labs and* Foxfire.

There was Samuel Spooner's cotton whipper and Philander Noble's method of propelling boats, Obadiah Stith's breech-loading rifle, Nimrod Willet's machine for making dough, Daniel Pettibone's coal-burning rarefying air stove, Ezra L'Hommedieu's auger, Ezra Southworth's inkstand, Jonathan Clark's esculent root cutter, Eliphalet Snow's silk reel, Raub's double self-acting safety valve to prevent the explosion of steam boilers, J. and C. Bruce's machine for ship biscuit, sea biscuit, Navy and pilot bread and the hook for bit and harness on which Asahel Hotchkiss and Ebenezer Gurnsey collaborated.

One in the shifting group of draftsmen who stayed with the project over the years was Charles Lewis Fleischmann. He made something of a specialty of heavy machinery—for boring rocks, digging cisterns, washing gold. He sketched in scenery—distant mountains, viaducts, cows—in a fine fluid style and peopled his pictures with bearded rivermen poling their rafts through rapids, red-visaged smithies, leathery-looking scourers of hides, bumpkin farmhands bearing sheaves, limp patients undergoing cures.

Bostonian John James Greenough joined the project as a draftsman in his twenties, having with his brother in 1832 established a stereotype foundry in Boston and contributed engravings to the American *Penny Magazine,* a version of the British *Penny Magazine* with additional matter.

Francis Benne, who followed his signatures with *delineavit* or *delt,* was listed in the Washington city directory for 1843 as draftsman-architect, and indeed he seems to have been the most highly trained of the delineators. It was he who turned out page after ele-

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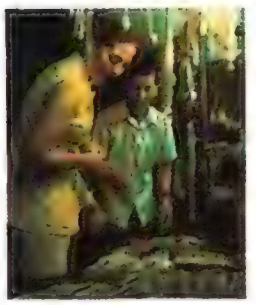

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Singapore

gant page—nicely laid out, titled in handsome flowing script, the most homely object, whether hay press or apple peeler, set off cleanly in space like a toy in a shop window or embedded in a matrix of fine and regular writing enumerating parts A through FFF ("common bedstead screws in the gudgeons") to XYZ.

George Strickland, who studied drawing with his older brother William, a prominent Philadelphia architect, was known for a series of scenes he did of Philadelphia; he had been a teacher of drawing at the Franklin Institute there before coming to the Patent Office in his later years. Like Benne's, his drawings are dramatically clean and clear, complete as to perspective view, top view, section and side, and colored in a characteristic range of pastels.

Charles Burton was born in England where he painted on glass for magic lanterns. He did a series of views of New York that were presented to Lafayette by the city. When he moved south he described himself, under the *Baltimore Sun's* 1839 heading of Business Cards, as scientific draftsman, professor of the art of perspective and teacher of drawing in general.

Perhaps because they were almost contemporary with the inventions, the artists managed to mirror the optimism and enthusiasm of the texts. They seemed to accept the cheerful assertions of "superiority"—Waldron Beach's claim that his self-sharpening plough was "less expensive and more perfect," or Charles Adams' that the rails of his windlass bedstead would prevent all "swagging or bagging of the sacking." The maker of yet another diving dress said boldly, "I throw off the India Rubber or gum elastic cap and substitute a cap of glass."

J. Heintzelman, with numerous padded elastic spring trusses to his credit, described the distress of protrusion with such rhetorical paragraphs that the drawings in magenta and yellow of contraptions and writhing straps seem to suggest the problem as well as the device for containing it.

From 1826, some of the patents begin to come off a

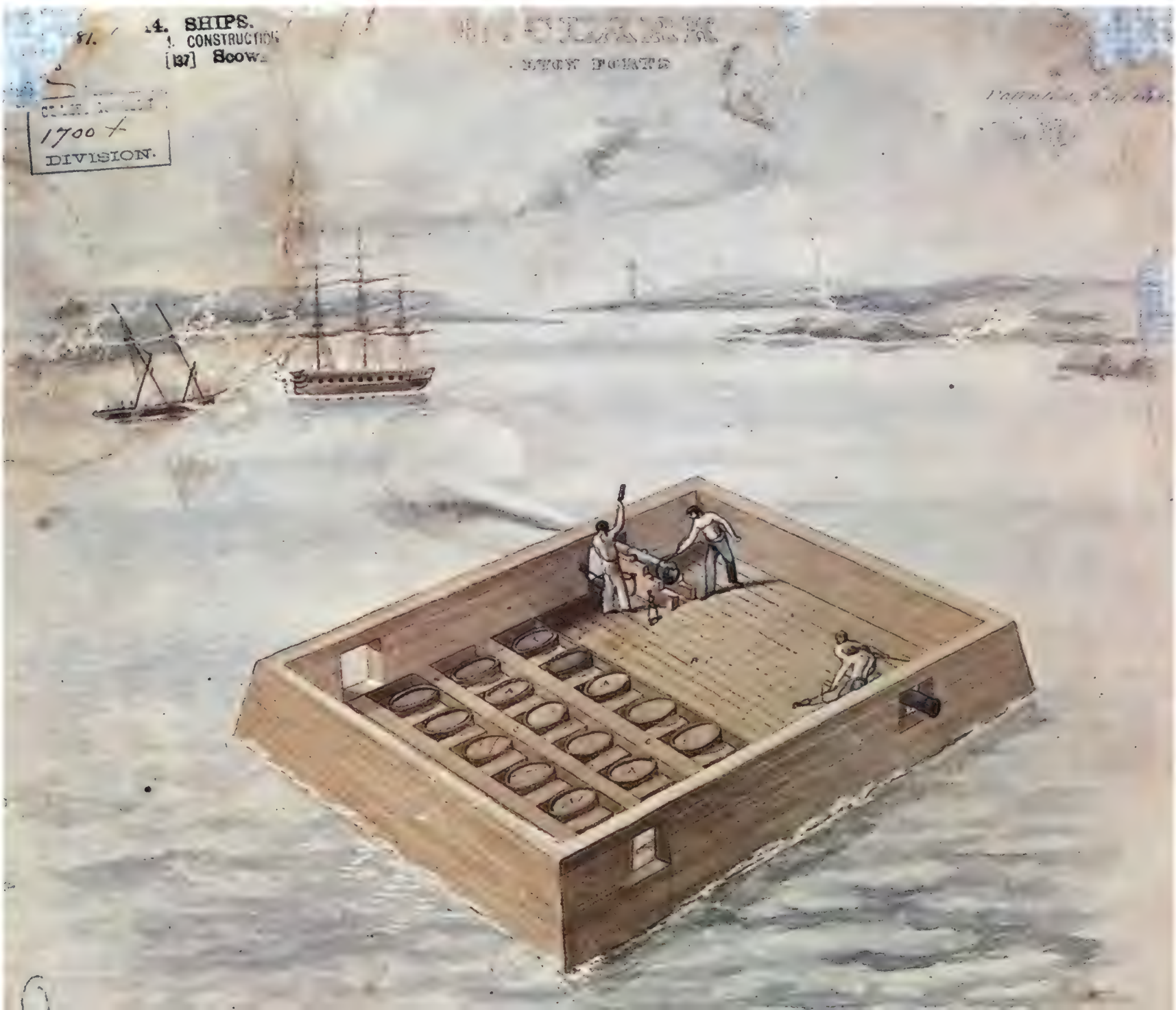
Dramatically delineated here, the *Life Escape and Fire Ladder* consisted of an elevatable wheeled platform, made stationary by props, stays and iron pins. Man with horn was optional.

bit less proudly, at least if one follows the commentary on them which began in that year in the Franklin Institute *Journal*. The *Journal* was frequently sarcastic. It would judge an improvement "trifling," or such that users of the "unimproved" version might consider themselves lucky. It said of Peregrine Williamson's self-tightening, sacking-bottom cot bedstead that "if it possessed a moiety of the virtues ascribed to it then it were a good thing." It was skeptical of curing dropsy with alternate doses of Seneca snakeroot and purple foxglove teas. And it said of Benjamin Grut's invention that if a patent for varnishing paper hats can be sustained, "we know not of anything which may not be securely patented."

The new patent law of 1836 was designed to change all that. For once again, as it had been from 1790-93 when Thomas Jefferson as Secretary of State scrutinized each application, haggling with its proposers and challenging their claims, the patent office was empowered to examine and to reject. The collection of drawings, now fading, now flaking off at the corners, spotted, scribbled on and mussed from 130 years of handling, covers the decades in between. It covers the period when grants were "unrestrained and promiscuous," when even a patent commissioner complained that inventors could receive, for $30, patents on ideas that weren't worth 30¢ and if they were advised to keep their money they would take offense.

With the new law designed to cut down on frivolity, on duplication and on fraud, the price to the inventor stayed the same (though it went up to $300 for foreigners excepting the British, who had to pay $500). And the quality of the application drawings seemed to go down. At least the drawings seemed less uniformly good, less lively. And what should appear, as #462 in the new and sober series, but an outfit of leggings coated with caoutchouc (yet another in a long line of caoutchouc clothing) designed for jumping—more or less safely—in business suit and top hat—from vessels into the sea.

Stoutly made of ribbed timbers and cross pieces, held up by empty casks or rum puncheons, this movable *Buoy Fort* would, its inventor said, make harbors secure as the need arose.



By John P. Wiley jr.

Maine, Canada test a magic bullet on the budworm

The crocodile of caterpillars is stripping millions of acres of trees, but a microbe may enable foresters to designate it for control

Shown closer to life size (note the fingers), a spruce budworm spins a silken thread to lower itself.

Every 40 years or so, a smallish caterpillar makes a serious attempt at eating every needle off every spruce and balsam fir tree on millions of acres in Maine and Canada. It has been doing this for thousands of years; for the last few hundred, men have been recording its efforts as they record the economic losses to themselves. This crocodile of caterpillars is the spruce budworm; as the name suggests, the emerging larvae feed first on the new needles inside the buds of spruce and fir trees. They then move on, however, to the old needles as well, lowering themselves on silken threads to another branch when they have denuded the one above. A tree can survive one such experience, but after two or three years of defoliation, the tree dies.

The spruce budworm is no imported menace like the gypsy moth that is eating its way out of the Northeast; it is native to North America. In most years the budworm population is too small to cause catastrophic damage. But when the spring is warm and dry, three or four years in a row, the population explodes, particularly in stands of trees 30 to 40 years old. After the larvae wipe out the stand where they started, they molt into clouds of moths that may stretch for miles and be carried by the wind into virgin areas. With the right weather, the effect snowballs each year until thousands of square miles are threatened, as they were this year. In the woods of Maine and Quebec, the spruce budworm has eaten and bred itself into a disaster.

This caterpillar, here vastly larger than life size, is one of billions of spruce budworms that are defoliating the spruce and balsam forests of Maine and Canada.

It may be that before man began to manage the forests, periodic explosions of budworms served some ecological purpose such as, we are now learning, forest fires do. But today the woods are owned and managed, and thousands of jobs depend on them. The question in Maine and Canada is not whether to fight the budworms, but how best to do it.

In Maine, the controversy centered in part on who would benefit and who should pay. The use of public money to protect private assets was questioned. Some went further and said it was possible that logging practices such as clear-cutting may abet budworm population explosion by insuring that all the trees in a stand reach the optimal state, from a budworm's point of view, at exactly the same time. Thus, to use tax money for spraying was in effect to subsidize bad management.

The paper companies argued that the trees are a living trust and that their continued good health is essential to the state's two largest industries—wood and its products and tourism. They also pointed out that if millions of trees are allowed to die, then mil-

lions of cords of wood will glut the market and dry it up for the farmer and small landowner.

The controversy also involved the issue of how best to fight the budworms. In years past, the solution was simple: Load up the old bombers and spray the hell out of the woods with DDT. Now that's forbidden and, even in the present emergency, few have suggested that an exception be made. So in 1975 the state used more expensive insecticides, and even so could not obtain enough to spray all the acres it wanted to. Maine officials had wanted to spray 3,500,000; they had to settle for 2,333,000.

At the same time, however, Maine expanded its experiments with bacteriological warfare, using a short-lived bacillus that is death on caterpillars and a relatively few other insects, but harmless to everything else. This year the bacillus was sprayed on about 11,000 acres west of Presque Isle. (The Quebec government tried the same magic bullet on 275,000 acres out of a total seven million sprayed.)

The weapon is *Bacillus thuringiensis*, known universally as B.t. Like a singer who worked professionally for years before being "discovered," B.t. has been around a long time, not only in the laboratories but as a commercial product. It may now be coming into its own, however, because B.t. itself has been steadily improved, and because of the increasing pressure for rifle rather than shotgun approaches to pest control. (Most of the B.t. used in Maine was Dipel, a formulation made by Abbott Laboratories. Other manufacturers market it under the names Thuricide and Biotrol.)

A full-grown B.t. bacterium contains two elements that make it a superb enemy of defoliators. The first is a diamond-shaped crystal of a toxic protein. When eaten by a caterpillar, the toxin attacks the gut wall, making the victim too sick to eat much and unable to digest what it does eat, so it starves to death. The toxin is specific to caterpillars: Only they have the enzymes and the properly alkaline digestive system to break the crystal down. The second feature is the reproductive spore which slips through the weakened gut wall into the insect's blood stream, a perfect growth medium for it, where it multiplies until it consumes the insect from the inside, also causing death.

Application is complicated. The bacterium is alive, and itself subject to death from a variety of causes, including the ultraviolet component of sunlight. So commercial preparations include added ingredients designed to protect the bacterium.

Does the stuff really work? Yes, with qualifications. It was found to kill silkworm larvae as early as 1901. Fifty years later serious commercial development began, and B.t. was found an excellent weapon against cabbage loopers, imported cabbage worms and other caterpillars that attack certain row crops. Later it was found effective against some tree defoliators, including the tent caterpillar, cankerworm, bagworm and spanworm. B.t. also works, but not as well, against the Douglas fir tussock moth currently ravaging the Pacific Northwest. The gypsy moth and the spruce budworm are also susceptible to B.t., but both are more difficult to control. The addition of the enzyme chitinase may increase gut permeability in the budworm. So far ground application has worked very well, while, until now, aerial spraying has produced erratic results.

Damage assessment takes time.

Because millions of acres are involved, the results of this year's experiments will not be known for another month or two. In Maine, Robley Nash, the state entomologist, said they would have a handle on the situation by mid-October. In Quebec, Gérard Paquet, director of entomological services for the province's department of lands and forests, said they hoped to have some results by the end of August.

In both areas budworm egg cases will be counted while the damage is assessed, and the insecticides rated on the foliage protection they provided. The number of egg cases is crucial to forecasting the severity of next year's infestation, which could be still worse.

The end of the current outbreak may be in sight, however. Epidemics move generally from west to east, as the moths are carried by the prevailing winds. Paquet said in July that the epidemic appeared to be slackening in the western part of the province. But the movement of the moths is slow. New Brunswick is still fighting the tail end of an outbreak that began in 1952.

Budworm outbreaks are not new. The use of microbial insecticides on a massive scale *is* new. Many people are hoping that, when the results are in, they will show that a rifle works better than a shotgun.

A still healthy forest near Moosehead Lake in Maine provides contrast to infested area, below.

Defoliated trees mark an infested area in northern Maine. Healthy trees are species the budworm ignores.

World War II bombers spray an infested area of Maine woods, alternating conventional insecticides and a microbe. They fly only in early morning and late evening, when there is no sunshine to create updrafts.

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A dedicated band of workers is fighting to save the imperiled environment and rescue our noble eagle from extinction. It is a worthy struggle. It can be won. Your help may also prove to be an excellent investment.

Of all the creatures that fly, the eagle is the most impressive, the noblest and the most powerful. Its wings may span 98 inches. It soars endlessly on rising air currents and its keen eye can spot a prey three miles away.

From the kings of ancient Egypt to the legions of Rome and Napoleon's armies, the eagle has symbolized power. Flags and military standards, coins, and seals representing orders of nobility or merit all were emblazoned with the eagle's fierce visage.

In 1782, by act of Congress, the bald eagle became our national symbol. In those days, the great bird was commonplace near water since fish constitutes half to four-fifths of its diet. Now, ironically, the very food the eagle depends upon for survival is killing him. DDT and other pesticides accumulate in the bodies of fish and the eagle is unable to produce viable eggs. Although it is now protected by federal law, the eagle is still the victim of trophy hunters. The once limitless king of the skies now finds refuge in wildlife sanctuaries.

The eagle is only one of 114 species and sub-species of wildlife in the United States now threatened with extinction. Foremost among the private non-profit agencies devoted to the protection of these and all forms of wildlife is the National Audubon Society. It maintains 44 sanctuaries throughout the country to provide safe nesting, feeding and resting sites for birds, and a protected environment for other wildlife. Jean Dorst, the great European environmental scientist has said, "The National Audubon Society . . . has done more to protect nature than any other private group in the world."

Uncompromising standards

About the time that eagles began to appear on the standards of the Ptolemies' Egyptian armies some 2000 years ago, the blowing iron was invented in Babylon. This simple hollow rod revolutionized glassmaking by making round forms possible. Seventeen centuries later it was discovered that the addition of lead monoxide produced glass of extreme brilliance and great weight. It was called crystal. When struck, it rang like a bell. Indeed, the first strike signalled the rise of a new art form.

The most artistically significant method of decoration developed was copper wheel engraving. In this highly demanding discipline, a master engraver interprets the artists' designs in intaglio by applying the crystal object to a small high-speed copper wheel anointed with oil and emery powder. He may use as many as 50 different wheels ranging from ⅛ inch to 4 inches in diameter to complete one engraving. The fate of every piece is entirely in his hands. One false move against the wheel condemns to the scrap heap what might otherwise have been a masterpiece.

Perfection in this intricate art is rare at best. Many attempts will be made before 5000 fine crystal plates will meet the standards of excellence necessary to be numbered as an American Eagle Plate in the Audubon Collection. Numbers will be assigned in the sequence in which orders are received. The subscription price is $198 postpaid. Because the hand production is very slow and painstaking, orders will be limited to one per subscriber.

THE AMERICAN EAGLE PLATE, first in a series of eight 10½" plates mouth-blown of Bavarian lead crystal. Designed by Albert Earle Gilbert, each plate is copper-wheel engraved, numbered, and signed. Edition limited to 5,000.

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The prospects of appreciation

Although the purpose of the Audubon Collection of Engraved Crystal Plates is to support the Society's vital work, there exists the prospect of appreciation. Of course, no assurances can be given. But it is interesting to note that fine crystal is considered a prime investment by many serious collectors. For example, a rather ordinary molded crystal plate offered at $25 in 1966 is currently quoted at $250, while another issued at $25 a year earlier is bringing $1250!

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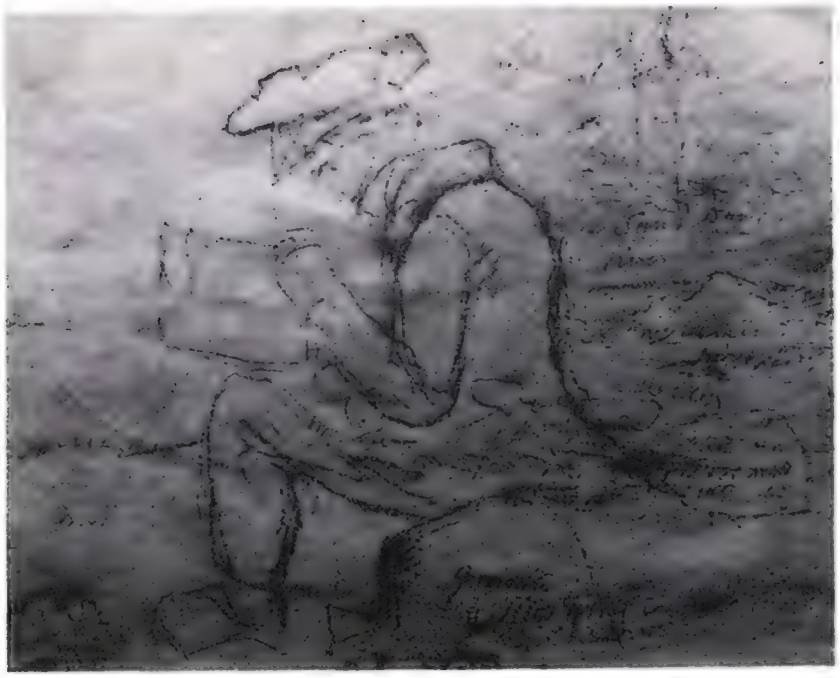
Send $198, check or money order (or bank charge account number, expiration date and signature) made payable to: Audubon Crystal, Ltd., c/o National Audubon Society, Dept. 89, 950 Third Ave., N.Y., N.Y. 10022. Please include your address and zip code. If, for any reason, you are not completely satisfied with your purchase, you may return it within 30 days for a full, unquestioned refund.

THE AUDUBON COLLECTION OF ENGRAVED CRYSTAL PLATES

In addition to the bald eagle, seven other endangered American birds will be engraved on crystal plates in the Audubon Collection: the whooping crane, brown pelican, peregrine falcon, ivory-billed woodpecker, California condor, masked bobwhite, and Kirtland's warbler.

Subscribers to the American Eagle plate are guaranteed the right to purchase each successive plate in the series bearing the same serial number.

The artist and designer of this extraordinary series is Albert Earl Gilbert, one of America's foremost wildlife artists. Sought after by ornithologists and art collectors alike, a 1973 edition of his wildlife prints is already commanding premium prices.



Fellow artist and traveling companion Henry C. Pratt sketched Cole sketching in 1828.

By Marcia Clark

A visionary artist who celebrated wilds of America

The exploratory journeys of Thomas Cole, sketched and later fixed in oil, created our native tradition of landscape painting

"The night of the fifth was rainy and the morning of the sixth opened in a threatening manner, but we started from Crawford's prepared for the worst. We had before us that wild mountain pass called the Notch, through which descends a rapid river without bridges. These with the roads had been washed away by the late floods. The distance was twelve miles and not a single house on the road excepting the deserted Willey house."

It was October of 1828 and Thomas Cole was mak-

One of the first artists to visit the White Mountains of New Hampshire, Cole was enraptured by the view and transmuted his experiences into visual records

of a spiritual grandeur which, combined with the grace of nature, he considered to be the essential soul of art. This is his *View in the White Mountains.*

ing his way through a flood-ravaged pass in the White Mountains of New Hampshire, accompanied by fellow artist Henry Cheever Pratt. It was just two years after heavy rains had started a landslide in which an entire family by the name of Willey had perished as they fled from their isolated house. The two men were setting out on a 12-mile sketching trip and would stop at the site of the slides in mid-journey. Pratt recalls in his journal: "We set out with our baggage on our backs, our boots over our pantaloons and our caps tied under our chins. This last step was found necessary for as I was just leaving the house I saw my cap floating on the water at a considerable distance."

In addition to violent winds that day, they had high water to contend with. The Saco River winds through the Notch; today Route 302 crosses it a number of times, though the bridges are broad and covered with blacktop and are hardly distinguishable from the rest of the road. That autumn of 1828, however, the wooden bridges were washed out and they forded delicately over fallen trees and rocks.

It is fortunate that the journals and the Cole sketches survived the journey. Together with sketches that Cole had made on a trip the year before, they form a vivid record of experiences on foot in the rugged mountain wilderness of New Hampshire well before the era of railroads and hotels. Moreover, they shed a revealing light on a formative period in the career of a painter who is seminal to the tradition of landscape painting in this country.

Until his time, artists had had to turn to Europe for schooling and an adequate market. The situation was changing, however, and Cole, a young English immigrant, could not have arrived on the scene at a better time. He was not the first painter of the American landscape, but he relied more fully and productively on his observations of nature than anyone earlier had done. His paintings reflected the characteristic appearance of relatively inaccessible places and appealed to an American public that was, paradoxically, as proud of the American wilderness as of the settlements and industries it was thrusting upon it.

The White Mountains did not simply provide Cole with new contours and configurations of subject matter. More basically, they brought forth conceptions of vastness and grandeur from which his epic vision emerged. The paintings were not literal statements but poetic evocations. The experience also acted as a catalyst for further and more visionary works which, as he told his patron Robert Gilmor, were "attempts at a higher style of landscape than . . . hitherto tried." The continuum between Cole's landscapes and his narrative paintings is perhaps best characterized in an earlier statement to Gilmor. "I believe," he said, "that it is of the greatest importance for a painter always to have his mind upon nature as the star by which he is to steer to excellence in his art," but "if the imagination is shackled and nothing is described but what we see, seldom will anything truly great be produced either in painting or in poetry."

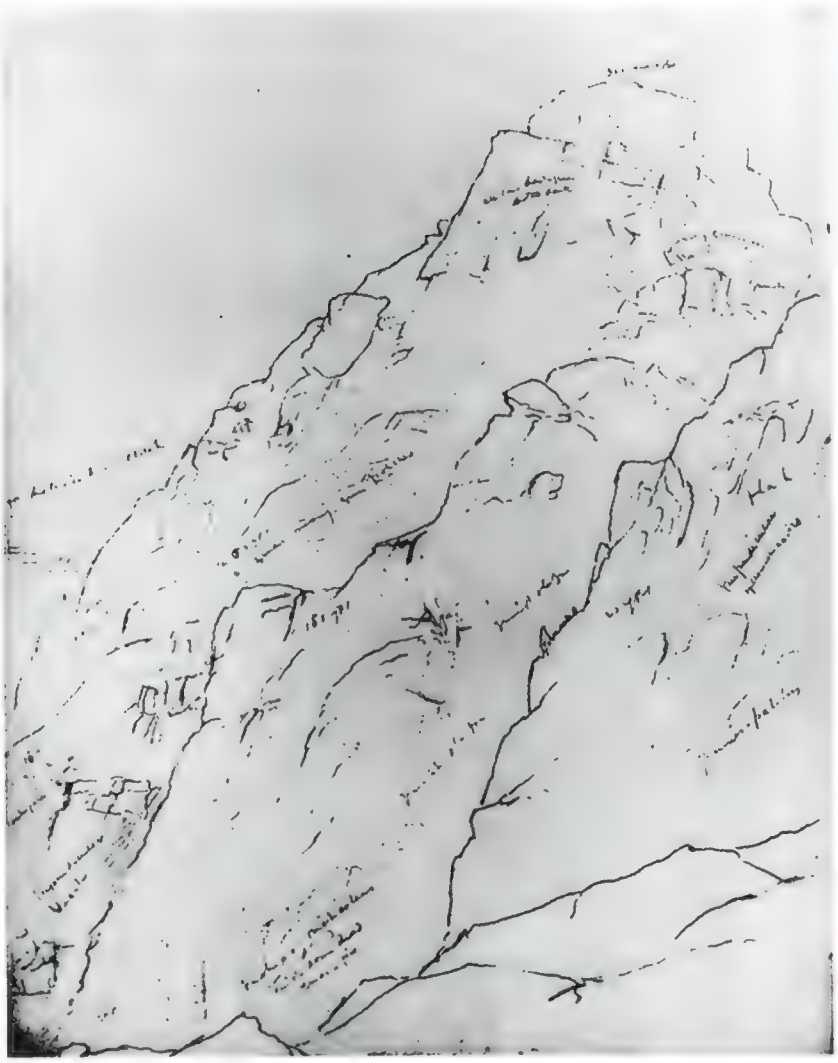
Cole's journal reflects the scope of his aspirations. It gives the reader a feeling for the actual physical experience of the journey and the way Cole related to it. One becomes sensible to the movements of nature, the rhythms of growth and change and the sometimes violent upheavals. These are reflected in the lore of the region, and particularly the Willey disaster, which fascinated Cole. For, had the ill-fated family remained in their house, they would have survived. The house remained unscathed while the family was wiped out by the slide that caught them in flight. Today the melancholy aspect of the Willey site remains apparent, an ominous reminder of the landslide.

Cole had arrived soon after the landslide and felt the impact keenly. His journal notes: "A strange mystery hangs over the events of that night. We walked among the rocks and felt as though we were but as worms, insignificant and feeble, for as worms a falling rock could crush us. We looked up at the pinnacles above us and measured ourselves and found ourselves as nothing. How awful must have been the darkness of that night with the crash of falling crags and rushing cataracts. It is impossible for description to give an adequate idea of this scene of desolation."

In his drawings done at the site, the human tragedy is all but swallowed up in the greater context of nature. Cole shows the ravages of storm and slides on the

A landscape painter herself, and former artist in residence at Big Bend National Park, Texas, Marcia Clark's admiration for Thomas Cole led her to the White Mountains to retrace his footsteps.

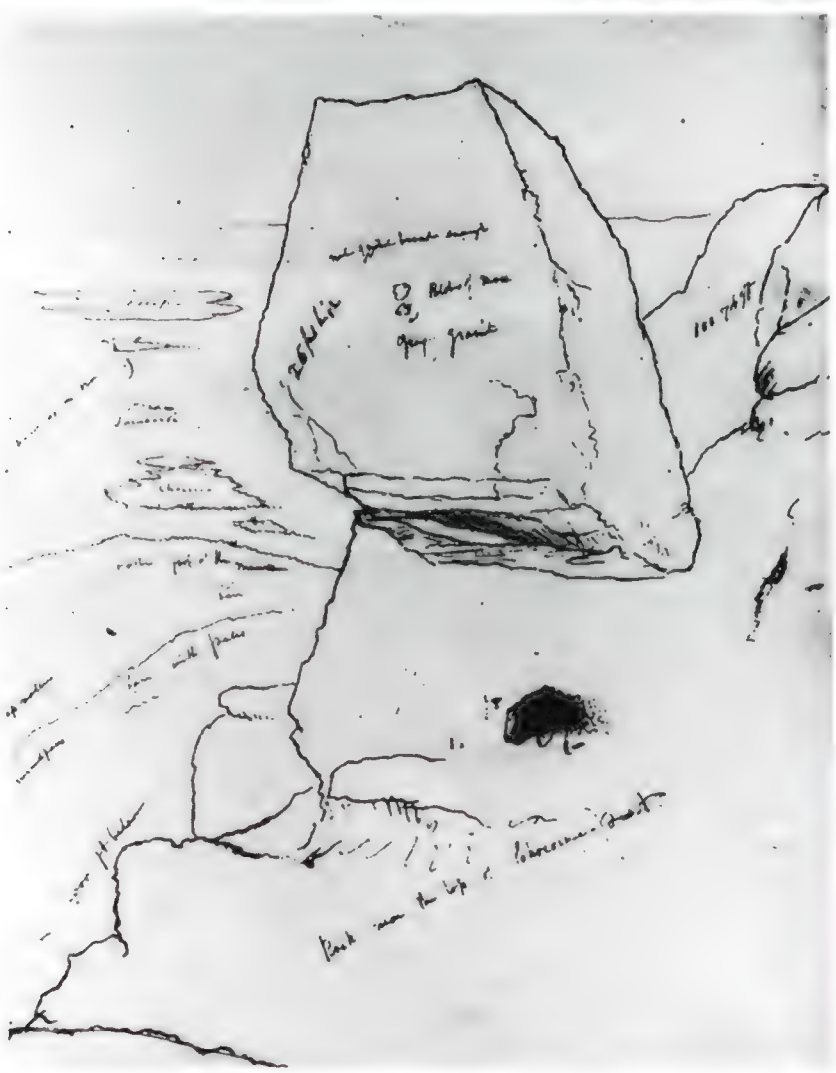
Detroit Institute of Arts



Near the summit of Mount Chocorua, Cole surveyed the commanding spectacle of its towering peak and

analyzed it almost anatomically. But the truth of his vision is on hand in this recent photograph.

Detroit Institute of Arts



This perilously balanced but formidable boulder, sketched on the slopes of Mount Chocorua,

caught Cole's eye in 1827. This photograph, made 147 years later, shows no apparent change.

mountainsides and in the narrow valley, and the house is but a tiny speck. The image calls to mind a number of early paintings in which the figure is dwarfed by tremendous trees. The contrasts result in a sense of scale and dramatic focus. In his paintings gradations of color and light are also employed expressively, and in some of them the play of contrasts becomes explicitly symbolic.

Other White Mountain features, including a huge overhanging rock, had also found their way into his *Last of the Mohicans* (opposite), although the setting for the scene from Cooper's story, which had just recently been published, was in the vicinity of Lake George. Cole also combined different features from a number of sketches for his landscapes. He felt that drawings from nature might be brought together into a whole that would create a more beautiful and effective painting than one painted from a single view.

In a letter dated December 4, 1827, Daniel Wadsworth, who had first urged Cole to see the White Mountains, naively asked Cole where in nature he might find the setting for his painting *View in the White Mountains* (pp. 90-91). He wanted to know specifically: "Is the scene of the mountain from near Crawford's house, or where and how far west of the Notch?" However, Cole had made some changes. He had altered the axis of the road in the foreground and added the prominent tree and windfall. Although he was almost certainly there in August, the peak is covered with snow, and a drawing states the season to be spring. The scene is compelling if not factual. The road is seen head-on rather than at an oblique angle, and it diminishes steeply to a vanishing point midway in the composition. Above what amounts to a first horizon, forested slopes swell outward to the edges of the composition and enclose the view of the sweeping mountain range.

Cole not only used Mount Chocorua as a background in his *Scene from "The Last of the Mohicans,"* he

Albany Institute of History and Art

Dramatic vision of lithograph of Cole's *Distant View of the Slides that Destroyed the Willey Family*

New York State Historical Association, Cooperstown

employed other White Mountain features for story set in the vicinity of Lake George, New York.

is contrasted with today's photograph of the same site, approaching the Willey slides.

The itinerary given Cole had set a route through the vicinity of Squam and Winnipesaukee lakes and up through the Notch, culminating in a climb of Mount Washington. This route became especially popular during the late 19th century and is still a standard one today for people coming up from Boston and points south.

The famous John Trumbull's nephew-in-law, Daniel Wadsworth, suggested that once Cole had made his way through the Notch he stay with Ethan Allen Crawford, an early settler who often guided visiting naturalists up the rugged mountain.

Spectacular mountain view

In 1827, of course, Cole would have had no other alternative, although Crawford's father also took in travelers at the southeast end of the Notch. The journals show that Cole stayed with both father and son in 1828.

The present Crawford Path over the southern peaks of the Presidential Range to Mount Washington is another which the Crawfords, father and son, had cleared. The route which Cole had taken to the summit, directly up the gentle slope of the northwest side of Mount Washington, was taken over by the Cog Railway in 1869.

No account remains of Cole's ascent of Mount Washington, but two drawings from the summit bear testimony to an uncommonly clear day for that high peak usually buried in the clouds. He identifies some of the mountains which lay along the journey in his view to the southeast, among them Mount Chocorua and Moat Mountain.

These views are spectacular and reveal the entire route, looking south to Lake Winnipesaukee, north to Crawford Notch and Mount Washington, and from Mount Washington looking westward to the Franconia Range. However, for Cole, the stimulus to an inner vision was of as great importance as the prospects which he saw. About his climb to the summit of Mount Chocorua he had said: "Lakes, mountains, streams, forests, villages and farms lay spread beneath us like a beautiful carpet. Some of the numerous lakes shone like silver. . . . The view was sublime but not a scene for the canvass [sic]. Too much like a map. It was not for pictures I ascended the mountain but for ideas of grandeur, for conceptions, and for these, this was the region."

Cole's feeling for scale and grandeur in the presence of nature was shared by the transcendentalist writers who were to follow him by a few years. They, along with Cole and other artists and writers of the period, contributed to an increasing appreciation by Americans of the beauty of their forests and wilderness.

Notable among these was Ralph Waldo Emerson, who had been traveling in the White Mountains in 1832. His journal entry from Crawford's house began: "The good of going into the mountains is that life is reconsidered. . . ." Thoreau's remark on the perspective from a mountaintop comes even closer to Cole's statement: "Many a man when I tell him that I have been on to a mountain asks me if I took a glass with me. No doubt I could have seen further with a glass, and particular objects more distinctly . . . but this has nothing to do with the peculiar beauty and grandeur of the view which an elevated position affords. It was not to see a few particular objects as if they were near at hand, as I had been accustomed to see them that I ascended the mountain, but to see an infinite variety far and near in their relation to each other, thus reduced to a single picture."

In the short period during which Cole had made his early journeys to the White Mountains, noticeable changes in his style had occurred. By the time of his second journey, his drawings had begun to reflect his observations more closely and he showed increasing freedom in synthesizing ideas. He was to attempt more complex allegorical paintings following his work on literary and Biblical themes, but he continued developing skills in painting landscapes which did not have explicit symbolism.

Cole regarded his walks and travels in the wilds as vital to his well-being. He also saw nature to be of basic importance to society at large as "an unfailing fountain of intellectual enjoyment where all may drink and be awakened to a keener perception of the beauty of our existence." He placed a similar value on art which he saw as "man's lowly imitation of the creative process of the Almighty." He felt that painting could not simply be a process of imitation, but that the artist must work according to the principles suggested by nature. He cast the artist in the role of a teacher unlocking perceptions to a deeper truth that lay beyond the literal. Cole felt it was essential for art as well as nature to be part of the fabric of human life. He saw the dichotomy between the American reverence for nature and the necessity to exploit it in the interest of utility and progress and was aware of the inherent dangers. In his "Lecture on American Scenery," given at the New York Lyceum in 1835 and subsequently published, he expressed the hope that in the future some wild areas might be set aside and that those being developed might be guided by intelligent planning and esthetic consideration. As for nature even in his own time, he said, with sensitivity and prescience: "The wayside is becoming shadeless and another generation will behold spots, now rife with beauty, desecrated by what is called improvement; which as yet generally destroys Nature's beauty without substituting that of Art."

In 1836 Cole made Catskill, New York, his permanent residence. He had discovered that village on a sketching trip up the Hudson in 1825. It was from sketches gathered on that early trip that his early success was based. Cole continued to make wilderness journeys outside the Catskill region. He returned to the White Mountains again in 1839 and made other journeys, which included the Adirondacks and Mount Desert Island on the coast of Maine.

Winters, Cole returned to his studio in New York City, which then as now was both marketplace and forum for artists. Gatherings with other artists and writers included such notable friends as the poet William Cullen Bryant (SMITHSONIAN, March 1974) and the artist Asher Durand. Durand also became a spokesman for American nature. Cole had marveled that "all nature here is new to art." Durand moved a step further from European tradition and in his writings stressed that it was not necessary to go abroad. He recommended originality in approach to "the virgin charms of our native land."

It was with Cole, however, that a native school of landscape painting had begun. He had recognized the power and beauty of the American wilderness and was able to convey a strong personal sense of that power and beauty within an artistic tradition.

In his last winter Cole had stayed in Catskill, working on what was to be his final allegorical series. He died there on February 11, 1848. He was 47.

Cole portrayed good and evil as light and darkness in nature's setting. His last allegorical series included this detail of an oil sketch, *A Pilgrim of the Cross,* which displays Cole's grand conception and moral fervor.

National Collection of Fine Arts

By Henry and Muffie Brandon

Communes keep food going to China's millions

Like small, nearly autonomous nations, these highly organized farms boast their own schools, clinics, markets—even capitalism

Wang Chi-ying is leader of Torch Production Brigade, part of a huge commune in western Shensi province.

China gets its lifeblood from its people's communes, 50,000 independent cells that provide its agricultural production. Actual figures are hard to come by, but the progress of agriculture is essentially the greatest achievement of the People's Republic. The Minister of Agriculture proudly told us that the government has built 100,000 miles of dikes and 70,000 reservoirs with a capacity of 2 billion cubic feet of water, and has accumulated 14 million tons of grain reserves as insurance against an agricultural crisis.

He also pointed out that the average output per acre for the whole country is only 1.5 tons—still very low. However, the battle to keep China fed is not only a matter of raising the output, but also one of population control.

We visited five communes in different parts of China. They and others like them vary in size and organization, ranging from 50,000 to 300,000 members. With 80 percent of China's roughly 800 million people living in the countryside, these communes are the key to the nation's existence and its future.

On a warm sunny Sunday we drove deep into the countryside from Sian, capital of Shensi province—which has a population equal to Britain's—to visit the Torch Production Brigade. Some 10 to 20 production brigades form a commune, and brigades such as Torch are made up of production teams, groups of 20 to 50 families who work the land in common. Sunday is no day of rest for these families but a day to engage in the remnants of private enterprise: On two-wheeled carts, bicycles and oxcarts, people head for roadside markets where chickens, pigs and crops from each family's small private plot are bartered and sold. Private plots cover no more than one-sixteenth of an acre, but they have a special meaning to each farmer. They provide supplementary food and personal income.

Driving along the sporadically paved road, we found mounds of cornstalks and wheat chaff strewn in our way. Farmers use passing trucks, army trucks and occasional taxis as handy threshing machines to prepare fodder for the winter. When we finally arrived at the Torch Brigade, we were greeted by Wang Chi-ying, commander of production. This confident, weathered leader, once an illiterate peasant, is now a national hero of production.

Wang led us along dirt roads from cotton to corn to

Chinese hillside was excavated and leveled for a playground, thus leaving croplands intact.

Wang Chi-ying's mother wears traditional turban and jacket when serving the authors lunch.

Young farm mother carrying four-day-old baby visits the maternity clinic on her commune.

cabbage fields; he showed us duck and pig farms, young poplars raised in rows for forestation, and apple orchards. He explained how the commune had straightened the nearby river and built a canal to reclaim some 100 acres of cropland. He took us up cliffs that had been carved out so that, without using land for crops, a site could be provided for a new school and playground.

Classrooms are built of clay bricks on terraces hewn from the hillside. Above are simple dormitories for teachers. They resemble monastic cells, with one light bulb suspended from the ceiling, a cot and a rough table and chair. Construction has been carried out by teachers and students as part of a work project.

A student who has finished the communal high school and wants to go to a university must have special recommendations from his teachers and his coworkers in the field. Many of the 280 Chinese "universities" are really trade schools or vocational training centers for perfecting skills needed on communes, but some peasant-worker students get a full university education. Adults, too, may be sent from a commune to a city school for a few months.

Health care, of course, is as vital a concern in the communes as education. We visited the Torch Brigade clinic where we saw a young paramedic, or "barefoot doctor," chopping local roots for traditional herbal medicines which are still in use today. He had trained for six months in an urban clinic, and then six more months in the field. His equipment is elemental: stethoscope, simple microscope, thermometer. He travels throughout the brigade by car. In larger communes, production teams have their own "barefoot doctors." He performs basic public health services such as testing water for drinking, caring for communicable diseases and distributing birth-control advice. He can also take X rays, give injections, prescribe simple medicines and refer more complicated cases to the nearest city hospital.

At the maternity clinic we discussed birth control with the supervising doctor. All types of contraceptives are freely distributed. The authorities use as much pressure as they can to control population growth, and claim to have reduced the annual birth rate to roughly two percent. What advice would he give to the mother of two children who found herself pregnant for the third time? Abortion. Two children is the sanctioned limit per family.

In China, foreigners are rarely invited into a family home to share a meal. So we were specially honored to be asked to lunch with Wang's family in his modest mud-brick house. In the small entrance room we saw the family's grain reserves stored as a protection against a bad harvest or, as Wang added, in case of war. This grim prospect is kept alive in everybody's mind by the political leadership.

Half the villagers have moved into new two-story, cinder-block buildings, but Wang chooses to stay in the old housing—two bedrooms for a family of five, a kitchen with a primitive stovepipe in the roof. Thus he demonstrates that he remains part of "the masses," national hero or no.

Wang's 70-year-old mother presided over the lunch like a dowager duchess. She wore the traditional black

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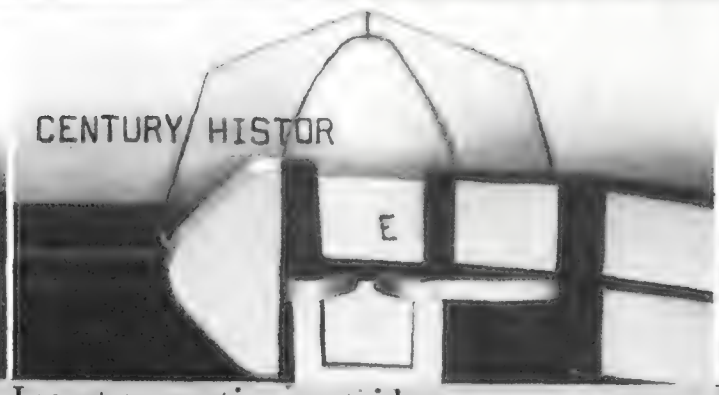

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"Barefoot doctor," with one year's training in a clinic and in the field, sees commune patient.

silk jacket and trousers and white silk turban. The meal consisted mainly of fresh food grown on the commune. In porcelain bowls we had a clear noodle soup, scrambled pigeon eggs, fried sweet potatoes, a mashed hot pepper sauce, soya bean curd, strong dark vinegar which we used as a spice over the vegetables, large onion rings, sliced chicken mixed with sauce, and bowls of rice. Golden apples from the nearby orchards followed as dessert. The table was very low and we had to perch on tiny footstools around it. The old lady served us and ate with us and so did her son, but the rest of the family remained in the kitchen, preparing the food. Later, we adjourned to Wang's high *k'and*—the traditional rural family bed made of bricks with a hollow oven inside for coals, the "central heating" of ancient China—for more discussion. Wang stressed his confidence that through self-reliance China would reach its goals.

"We have two tractors, but we need more." Such admissions should never be confused with humility.

Wang explained how the communes evolved after the landlords were removed and their deeds and receipts burned. First, peasants formed mutual-aid teams to raise food on their own land. Then, elementary producers' cooperatives were formed and, finally, the communes. Those peasants who still clung to ancient superstitions found the change hard. When severe drought threatened rural areas of Hangchow in 1950, for instance, the peasants invited the Dragon—traditional symbol of the emperor—to intercede. They fished a frog, incarnation of the all-powerful, water-sponsored Dragon, from a pond, seated the little fellow on a sedan chair, and paraded him through the village. Firecrackers popped, paper banners waved and the women, of course, were told to stay indoors to avoid displeasing the Great Dragon. When the rains failed to come, the villagers were disillusioned and more easily mobilized by the Communists. Much later, when electrical pumps were introduced, old villagers baptized them "iron dragons."

The "Great Leap Forward" in 1958 caused further upheavals. But now the peasants, too, lost their private plots, their meager savings, and even their work-incentive pay.

Wang told us that surviving landlords are now mostly peasant workers on communes. Some remain "bad elements," ideologically unfit.

Communes today not only grow food, but run small-scale industrial enterprises—flour mills, foundries, repair shops, clay brick ovens, cottage industries, savings banks and their own little supermarkets which sell bicycles, sewing machines, linens, clothes, knitting wool, candy, fruit and kitchen utensils.

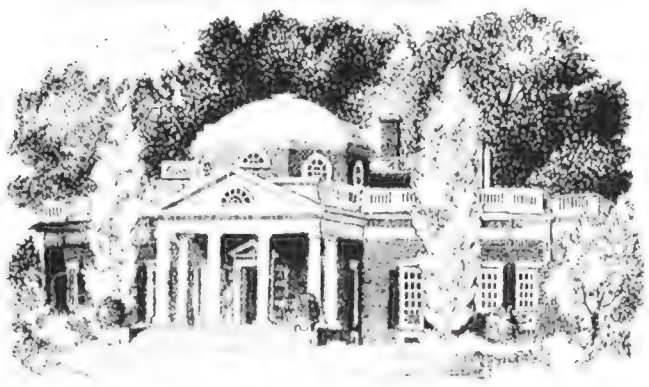
Each commune is run by a revolutionary committee which, in turn, is responsible to a regional revolutionary committee, and ultimately to provincial and central government. Wang was particularly influential because he was a member of the regional revolutionary committee. But there was no doubt that the Communist Party and the Municipal Revolutionary Committee have the ultimate power.

Each commune is relatively free to decide how best to achieve the set goals. On their achievement depends the annual return each member of a commune receives after the commune has paid for all its expenses

Henry Brandon, Washington correspondent for The Sunday Times *of London, and his wife, Muffie, recently traveled extensively in China.*

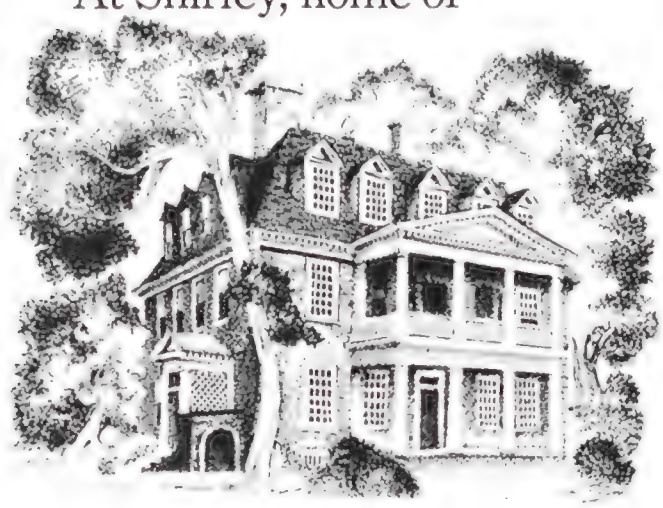
Virginia invites you to visit the most beautiful homes in America's history.

An inside look at the homes where America grew up is just part of the excitement as Virginia welcomes fall with open arms and doors and garden gates. And presidential masterpieces like Mount Vernon and



Monticello are just the beginning.

You can explore America's great indoors along the James, too, as it flows back to the golden age of the plantation in room after room filled with antiques and memories. At Shirley, home of



the Hill-Carter family for nine generations. At Carter's Grove, "the most beautiful house in America." At Berkeley, where Thanksgiving began in 1619.

You can visit the oldest brick house in English America—Adam Thoroughgood built it near Norfolk 350 years

ago. Or you can go north along the Potomac to Stratford Hall, home of the Lees', and on to George Mason's Gunston Hall. But wherever you go, from Patrick Henry's Red Hill to the Fredericksburg home of Washington's only sister, give yourself time.

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Virginia is for lovers.

Commune farmers work way along irrigated strips. Another group spreads across distant field.

During break in their day's labors, commune women listen politely to a lecture on ideology.

and delivered its taxes (grain) to the state authorities. Individual achievement can be rewarded through incentive pay. We noticed a certain amount of conflict over whether harder work should indeed be specially rewarded or whether high productivity should simply be achieved by high political consciousness.

A day on a Chinese commune begins at first light. Martial music and official morning news over the all-pervasive loudspeaker stir China to work. As the mist rises from lakes, valleys and deltas, millions of families breakfast on rice, tea and fruit. Then parents take young children to the communal nursery and begin another day in the fields. Usually all are at work by six. Old women stay at home to free young mothers for heavy work. Childless elderly couples become wards of the commune, guaranteed food, shelter, clothing, medical care and a funeral. With Wang we visited the mud hut of one old couple—like the rest except that in an alcove we saw two simple coffins. Though cremation is officially recommended in the cities, old ways hang on in the country.

At noon, many peasants come home for lunch, for communal dining has proved unpopular. Lunch is followed by a rest period until 2 or 2:30. Work on the commune ends just before dusk. In winter the workday is often as short as four hours to make up for the grueling timetable during the growing season, when the peasants get only one day off per month.

Peasants tend to earn a little less than factory workers. Soldiers of the Red Army earn a little more than either. On the Peing Pu People's Commune outside Shanghai, Chen Yung-kwei, 29, and his wife Ho Hong-ching, 28, told us that their combined earnings were $53 per month. Out of this they pay 70 cents per month for actual rent and $1.50 for monthly maintenance of their two-bedroom house. They also pay $1 annually for family medical care and $10 per month for little Chen's nursery school. Grade school is about $2.50 per month. Their most treasured possessions are a bicycle ($75) and a sewing machine ($70). Food and clothing together amount to roughly $20 per month. Last year five working members of the Chen family were able to save $300.

Government officials say China is now growing food fast enough to stave off starvation and to keep up with population growth. Premier Chou En-lai, however, recently said that this race will continue at least until the year 2000.

As dusk settles over the communes of China, peasant workers stream wearily home from the fields. Weak electric bulbs spread a dull glow over villages. Families settle down for the evening meal around seven o'clock. Afterward the children go to bed; the younger people study for school or go to evening courses to improve their understanding of Marxism, Leninism and Maoism. Old men play chess; women knit or sew. On weekends amateur plays or concerts are performed by communal musicians and films are shown. The latter are all part of the political indoctrination program. No films from the western world are allowed.

Lights go out by nine. Then, in the morning, the communes resume their burden of feeding China.

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Book reviews

The Anatomical Works of George Stubbs, including 250 black-and-white plates
Terence Doherty
(David R. Godine, $65 to October 1; $85 thereafter)

It sometimes happens that an artist falls into obscurity after his death and has to wait for several generations before being rediscovered. George Stubbs never suffered total eclipse, but in the history of 18th-century English art he has been generally neglected or dismissed as a mere animal painter. It is revealing that when American millionaires such as Huntington or Frick were collecting English pictures, they bought fashionable portraits by Reynolds, Gainsborough and Romney, or landscapes by Turner and Constable. Stubbs was not included. Yet now he is generally recognized to be the equal of all these masters. This change of opinion has come about largely in the last 30 years. Stubbs' reputation was foretold by his patron Josiah Wedgwood when he wrote in 1780: ". . . Nobody suspects Mr. Stubs [sic] of painting any thing but horses and lions, or dogs and tigers. . . ."

Several exhibitions and publications have done much to reverse this injustice. This extremely handsome book is the first to concentrate on the anatomical drawings and engravings of Stubbs and should convince everyone that he was a superb draftsman and anatomist, and unrivaled in his knowledge of the horse.

Stubbs' etchings for Dr. John Barton's *Essay* on midwifery helped to increase the understanding of obstetrics, still half-clouded in ignorance at a time when it was difficult to obtain corpses legally for dissection. Shortly after his death, it was reported that "to procure objects for his improvement Mr. Stubbs has, an hundred times, run into such adventures as might subject anyone with less honourable motives to the greatest severity of the law."

His dedication to his work is shown in the widely known story of Stubbs retiring to an isolated Lincolnshire farmhouse to work on *The Anatomy of the Horse* and keeping the carcasses of the animals for so long that the stench was unbearable.

Mr. Doherty has performed a service to

Stubbs' *Human Skeleton,* anterior view.

Stubbs' *Human Skeleton,* posterior view.

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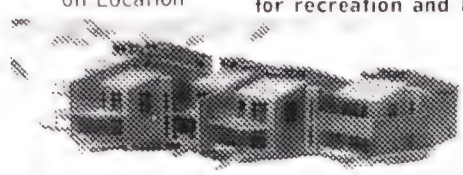

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English art in the publication of these superb illustrations. Even if individuals may find the price rather steep, the book should be in the art reference section of public libraries, and no doubt hippophiles will be glad to possess it themselves. While the text forms only a part of the whole, we are given a good résumé of Stubbs' career with an interesting history of dissection. The author is right to remind us that many great artists of the past, Donatello, Leonardo and Michelangelo, all masters of the human and equine forms, were known to or presumed to have dissected. Leonardo, with his love of nature, comes closest to Stubbs and something of his reverence for all creation appears also in the English painter.

From his youth Stubbs had been accustomed to seeing the slaughtered animals in the abattoirs near his father's currying yard (today's tannery), and at an early age made drawings and carried out dissections. This interest, which was almost an obsessive passion, remained with him throughout his life. He was working on *A Comparative Anatomical Exposition of the Human Body with that of a Tiger and a Common Fowl* the day he died. The drawings for these are owned by the Public Library in Worcester, Massachusetts, and are on loan to the Worcester Art Museum. It is good to know that, with the Mellon collection in the National Gallery of Art, there is such an ample representation of this great artist in the United States.

—Ross Watson
Former curator of the Paul Mellon Collection, now a curator at the National Gallery of Art

The Forest Killers
Jack Shepherd
(Weybright and Talley, $14.95)

This is a book worth reading, but not a great one. Though ranging broadly from timber-industry political machinations to federal export policy, it is a book primarily about the U.S. Forest Service, national forests, and the bitter public controversies of recent years. It should be required reading for government officials, for it presents comprehensively—even exhaustively—the environmental activist's case against the Forest Service.

Unfortunately for the layman, the author is too biased to put that case in

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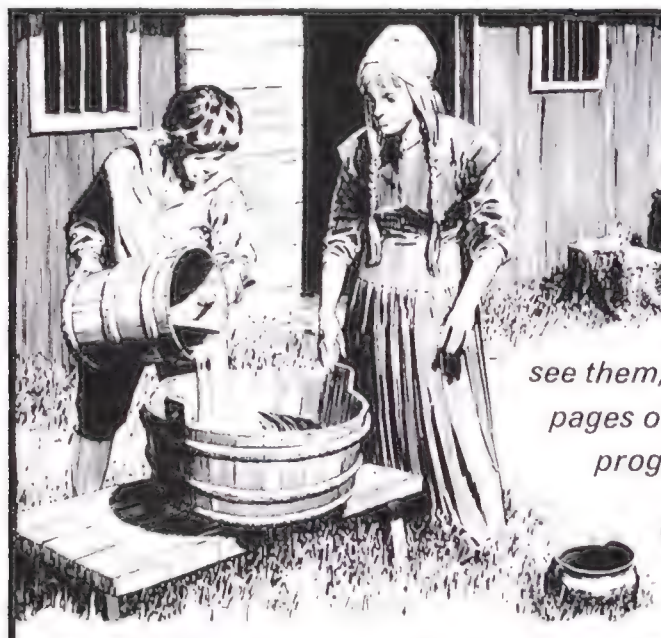

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proper context. He deals with an extremely complex subject from a single-minded point of view. To an environmentalist who regards himself as a friend of the Forest Service (a critical friend, to be sure), this book seems apart from political reality—though it jabs competently from time to time at Congress, former President Richard Nixon, Agriculture Secretary Butz and the Office of Management and Budget. Because it is so one-sided, it will be of minimal help to anyone new to forest debates who really wants to understand the issues. In short, for those who would profit from the central message of this book, it should have been better balanced.

The Forest Killers is written by a man who loves forests and trees left undisturbed where they grow. Jack Shepherd has a solid feel for the land; one is confident that he has visited most of the places about which he writes. Beyond that, Shepherd is a researcher who builds his side of the case very well. He superbly documents mindless decisions about road building; he delivers an intensive broadside against clear-cutting policies and practices; he reports forest destruction by miners and second-home builders alike. And he reviews well issues as complex as wilderness—demonstrating that the Forest Service of today has difficulty learning sound lessons from its early leaders.

Included is good documentation of the Nixon administration's repeated efforts to raid the national forests. The book quotes the late Pennsylvania Congressman John Saylor, to the effect that public concerns were to be rendered "subservient to the pressures and profits of the logging and lumber industry."

The book should have been organized differently. The author closes with an overview which might better have led off —summarizing the inadequacies of Forest Service budget and manpower levels, fundamental problems which in an era of extreme pressures on forest resources generate critical program weaknesses. Jack Shepherd is not alone in having watched the Forest Service fail to complete purchase of lands under option, but the Service does not, as he charges, stop buying—Congress simply stops appropriating.

The Forest Killers ignores basic pressures created by population growth and per capita aspirations. It almost denies the need for housing. It fails to state that the Forest Service needs broad public sup-

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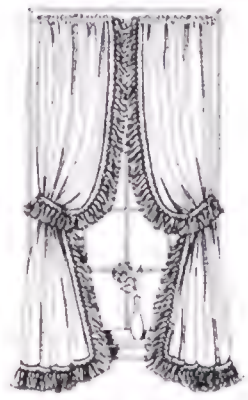

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port to achieve these management goals.

Jack Shepherd is first and foremost a wilderness advocate. He equates "cutting" with "destroying"—and that colors his whole view of what's going on in our national forests and the agency which administers them.

—*Robert T. Dennis*
Conservation expert and Executive Director of Zero Population Growth, Inc.

Woman's Work: The Housewife, Past and Present
Ann Oakley
(Pantheon, $8.95)
Female of the Species
M. Kay Martin and Barbara Voorhies
(Columbia University Press, $6.50)

Ann Oakley focuses most of her attention on England, taking us from a preindustrial era, when agriculture and textiles were the chief occupations of the British people, to modern times. In her view women had it better then. The family was an integrated force within the whole economic structure. Men, women and children all worked closely together, in common pursuits, from the home itself. "In their role as agriculturalists," she tells us, "women produced the bulk of the country's food supply." Other women's roles included miller, innkeeper, butcher and fishwife. A woman could be leather seller, carpenter, goldsmith, blacksmith, draper or apothecary. With women's work in textiles the system of family industry was even more obvious. According to Neil Smelser, whom Oakley quotes: "Most processes of production were fused with the nuclear family. . . . the father wove and apprenticed his sons into weaving. The mother . . . spun, taught the daughters how to spin, and allocated the picking, cleaning, drying, carding, etc. among the children."

By comparison, Oakley offers Alice Clark's description. Modern women's "ordinary domestic occupations . . . consist in tending babies and young children . . . in preparing household meals, and in keeping the house clean." Oakley's argument that housework *is* work is certainly valid. That, as work, it lacks a motivating factor, not helping the housewife to get any information about herself from the work she does, is arguable. Relegating the household chores to women purely on a sexual basis, she says convincingly, has

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kept equality for women from becoming a total reality. From 40 interviews she has chosen four housewives to speak to us. The result is quite similar in each case: a dissatisfied woman, dismayed by routine, heavily burdened with detail, spinning in an ever-widening gyre of household minutiae, unable to clear either her life, mind or kitchen sink long enough to see beyond the immediate horizon. Yet something seems awry. Is it Oakley's choice of interviewees, her line of questioning or her Marxist views? Certainly she seems to be throwing the baby out with the bath when she concludes: "The housewife role. . . . The family. . . . Gender roles must be abolished."

Martin and Voorhies, considerably more dryly and pedantically, argue that though societies have perpetuated sex categories to facilitate socioeconomic interdependence and cooperation among group members, there will still be families when women are integrated into the work force. What they do foresee, however, is that many of the tasks now done by housewives will be shared by men and women.

Both volumes attempt to explain how modern housewives got into their so-called "idle" (economically nonproductive) position. (The Industrial Revolution produced the status symbol of the stay-at-home wife.) And both take on Lionel Tiger *(Men in Groups)* with considerable relish, arguing against his partisan scholarship, especially on the subject of male bonding for the hunt and warfare. But Martin and Voorhies, because they delve into a great many primitive cultures, describing a variety of societal divisions of the sexes for work—women as gatherers, women in horticultural, agricultural, pastoral and industrial societies—seem on sounder ground. They also reveal patterns of sexual grouping for work which might well be considered by a future society. Yet, interestingly enough, their scholarship fails to turn up *any* society in which women get away from household tasks entirely.

The subject of "woman's work" could stand a good deal more investigation—by women. Perhaps only then could modern woman escape the pitiable position of the dying housewife, speaking in a rhyme which Oakley quotes: "Don't mourn me for now, don't mourn me for never; I am going to do nothing for ever and ever."

—Kay Cassill

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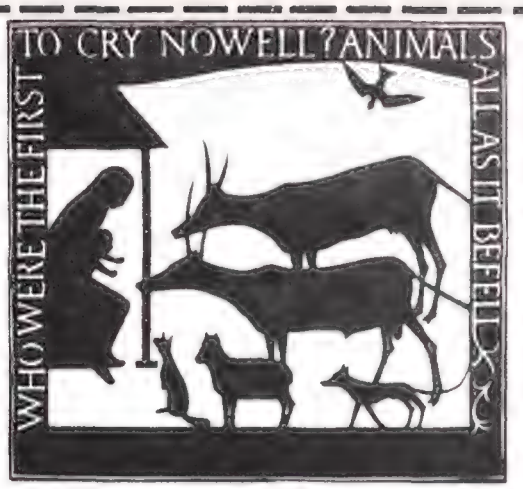

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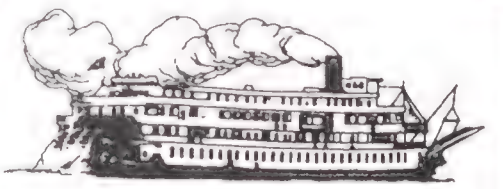

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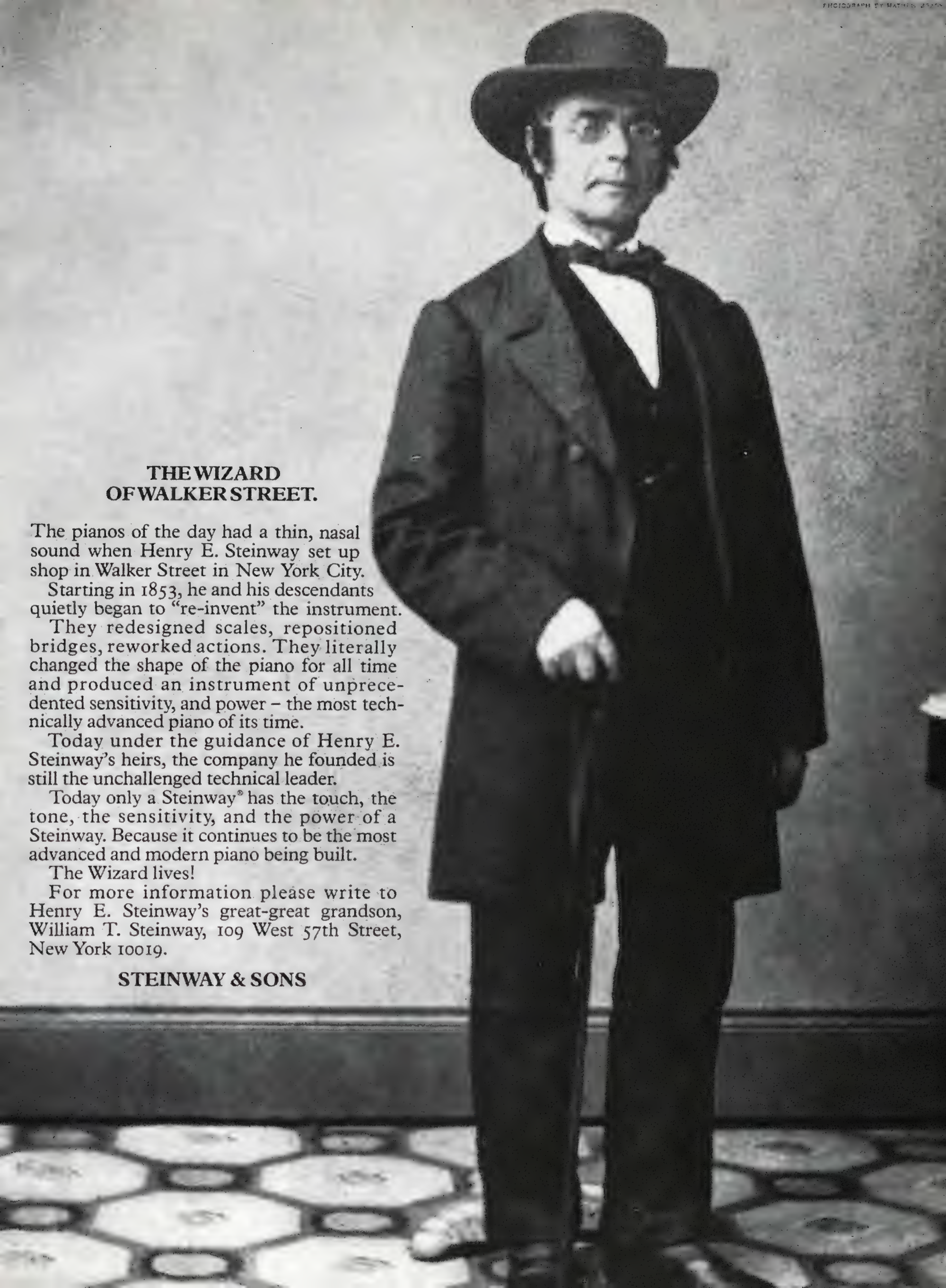
New Standard Encyclopedia. 1975 Edition. 14 volumes. Illustrated. Photographs. (Standard Educational Corporation, Chicago, $249.50)

Finally, an encyclopedia that ranks Hank Aaron as the world's most prolific home-run hitter. It's about time. Everyone knows that keeping up to date is hard work. For publishers of encyclopedias, I suppose it's like painting the Chesapeake Bay Bridge: Once you think you're finished, it's nearly time to start the process all over again.

Among other things, this new encyclopedia gets high marks for the way it has of compiling easy-to-scan lists or rankings under certain headings. Earthquakes, for example. In 1883, the eruption of Krakatoa, a small island between Java and Sumatra, was accompanied by earthquakes. The strange part about receiving new information like this is that it must displace old information. A movie of a few years back, *Krakatoa, East of Java,* while offering nothing else memorable, did at least firmly set the geography of the island. Guess what? Krakatoa is *west* of Java.

The trouble with encyclopedias is that they can't be enthusiastic enough. Look at the John Ruskin entry, for instance. All the dates, relatives and book titles are there—but little of the *life.* Where are the drama and tensions of living? All lost in a welter of facts. Thus, you can read here that Ruskin published his autobiography, *Praeterita,* in 1885. What you can't learn is that in it Ruskin lets us in on what was surely the high point of his early life: when his evangelist mother, who never allowed her son sweets, deigned to give him three raisins. Ruskin was a tyke at the time, but he remembered it until his last days. We should too.

Encyclopedias and encyclopedists have not always been so worried about "facts." From Aristotle and Pliny the Elder to Isidore of Seville (7th century) and William Caxton (15th century), the world was a vast and puzzling place. It was not so much to be learned about as survived. It thus fell to the classical encyclopedists and medieval bestiary writers to fill in the lacunae. In general, these writers worked thanklessly, and at times under the worst of conditions. In A.D. 79, for example, Pliny the Elder got a little too close to Vesuvius during its troubles and was never again useful to either his encyclo-



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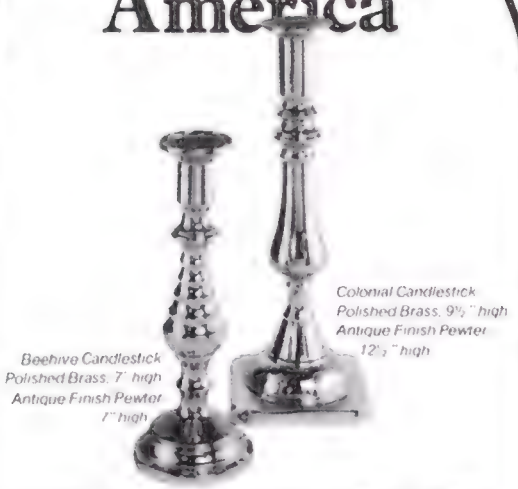

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pedia or his readers (probably the first casualty for Eyewitness News). But the bestiary writers were easily the most resourceful. They told the world that lions use the brush at the end of their tails to dust away their tracks. Similarly, sailors were warned not to light signal fires on soft islands—at least not until they had made some attempt to find out if they had landed on a whale.

And elephants, as you doubtless know, have no knee joints. If you have ever seen a picture of one, you'll recognize how true this is. All you need do is take a close look at those four oaks that God gave the elephant instead of legs. There you have it. Those legs weren't meant for bending. As a result, elephants take a great deal of care to avoid falling down. This also means that the elephant must sleep standing up—usually leaning against a good stout tree for the entire night. Armed with this useful information, of course, a prospective observer need only follow an elephant until he discovers the animal's favorite sleep-tree, return the next day and saw three-quarters through its trunk, and then wait the fruits of his labor. The first light of morning should present him with a supine subject.

Now, I do not repeat this tale because it is quaint, the way a great deal of talk about ancient cultures often gets to be. This was serious business: For medieval man, the precise details of elephantine anatomy were unimportant. What mattered was the conduct of one's personal life. Or, in this case, it was important to learn what God was trying to tell man through the elephant: Beware of the devil and his deceits (like those of the hunter and the saw).

Today, of course, we have a far different idea of what facts are; and the *New Standard Encyclopedia* does a good job of letting us in on them. One of its features is acetate overlays. They are used profitably to enable inquisitive youngsters to get a layered view of the insides of things. Human anatomy, for example. And the encyclopedia's stylized diagrams are also helpful—I don't care what a ruminant's stomach really looks like; I'm satisfied with its treatment in the *New Standard Encyclopedia*. Altogether, its modest price and quick coverage seem to make this the very thing for school assignments and everyday use.

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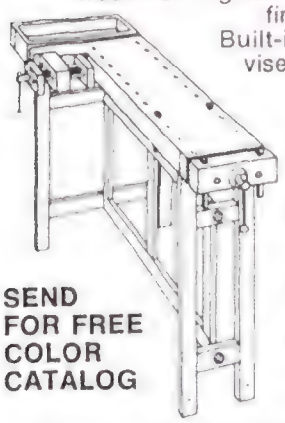

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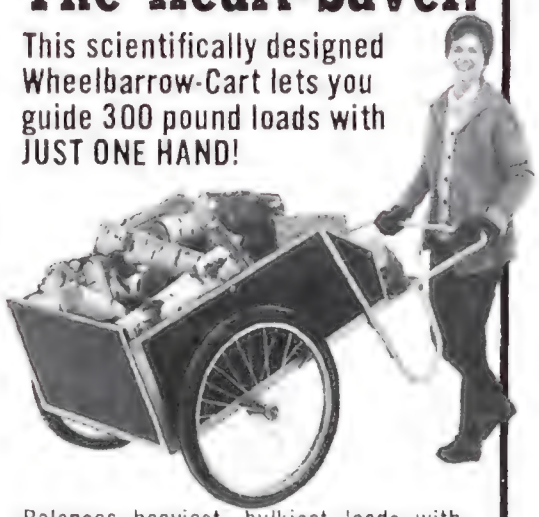

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Additional reading

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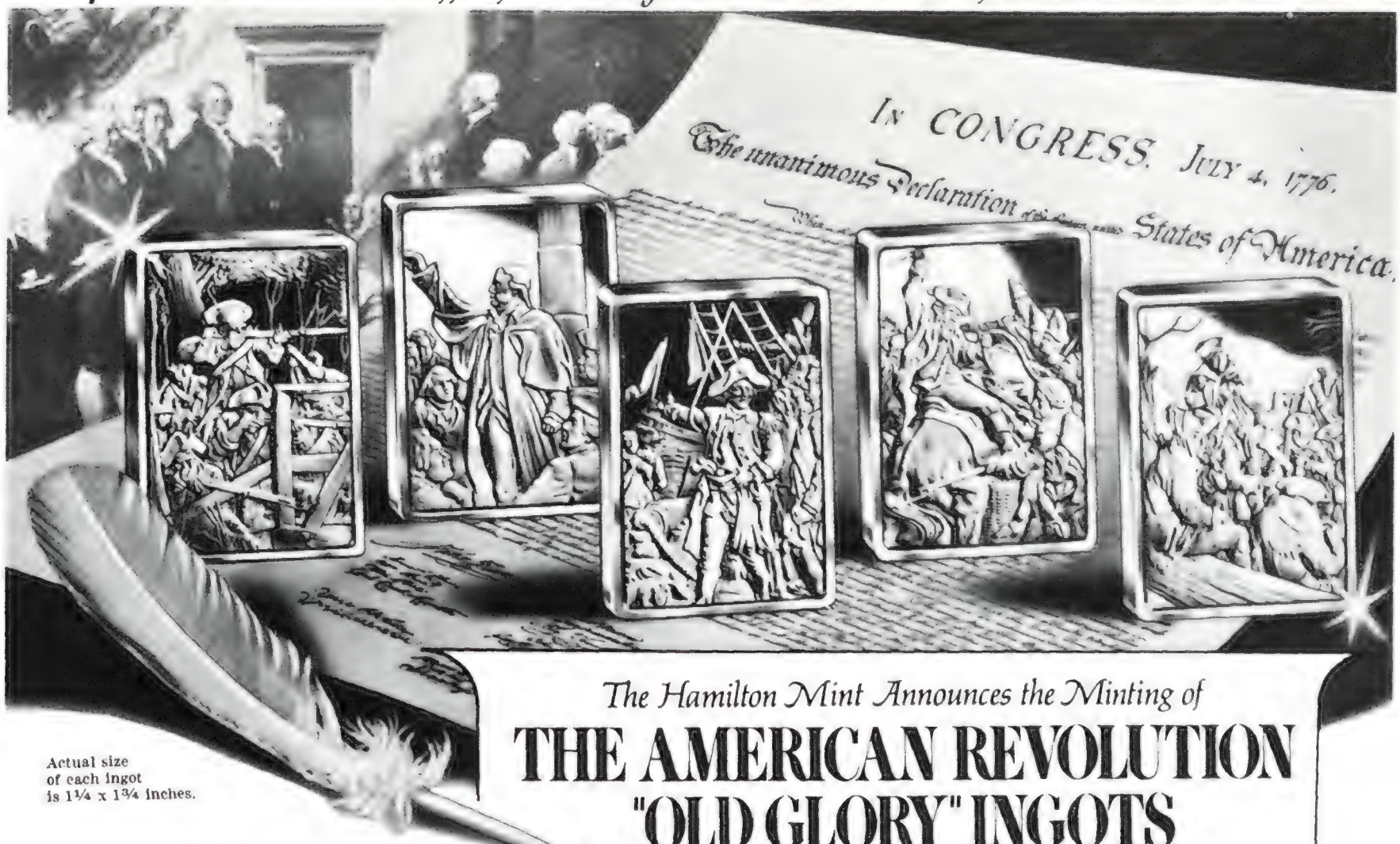

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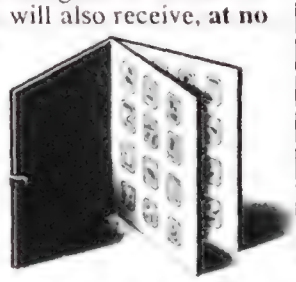

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Smithsonian highlights

Hirshhorn Museum and Sculpture Garden

Initiating the museum's special exhibition schedule is "A Retrospective Exhibition of Works by the Venezuelan Artist Jesús Rafael Soto." More than 50 examples of the artist's work, spanning nearly three decades, are on loan from public and private collections in Caracas, Paris and New York. A special work, part of a series known as "Penetrables," is the highlight of the exhibition. The "Penetrables" are constructions which the observer enters, thus becoming a participant in the completion of the sculpture. Many works are from the newly opened Museo de Arte Moderno Jesús Soto, located in the artist's native city of Ciudad Bolívar. The show is in the lower-level special exhibition gallery—opens September 25.

National Collection of Fine Arts

"Louis Lozowick (1892-1973)" is an exhibition of 60 drawings and lithographs executed between 1923 and 1973 by an American master of black and white. Lozowick developed a highly personal form of precisionism in his studies of city and industrial structures during the 1930s. Later, he concentrated more on the worker and his environment. His pieces range from bold, black, constructivist machine forms to softly modulated lithographic still lifes—opens September 12.

Bicentennial Information

Any Associate planning to come to Washington next year should write for advice to the Visitor and Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560.

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From the pages of SMITHSONIAN

THE NEW EARTH

A Revolution Called Plate Tectonics

Text by Tom Alexander
Illustrations by Richard Edes Harrison and Antonio Petruccelli

Reprinted in full four color from the January and February 1975 SMITHSONIAN.

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Write: SMITHSONIAN Magazine, Smithsonian Institution, 900 Jefferson Drive, Washington, D.C. 20560

A Toast to American History

Now, at the time of our Bicentennial, you can toast our American heritage with this beautiful silver or pewter adaptation of the Fort McHenry Punch Cup. This latest addition to the Smithsonian Series was taken from a silver punch set presented to Colonel George Armistead by the Baltimore citizenry in recognition of his successful defense of Fort McHenry against the British during the war of 1812. It was the sight of the American Flag still waving over the fort at dawn after an all night bombardment that inspired Francis Scott Key to write the "Star Spangled Banner."

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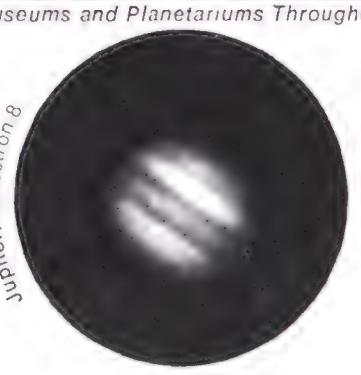

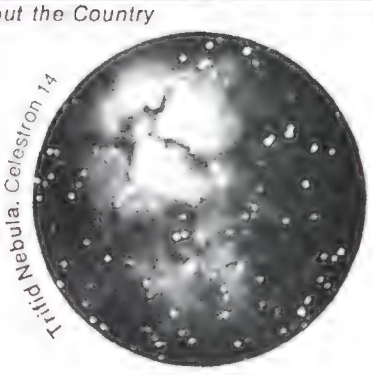

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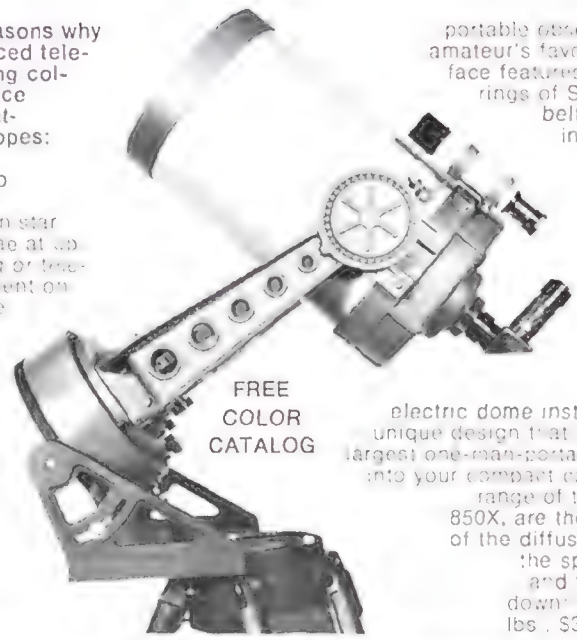
The Celestron 8. Eight full inches of aperture make this portable observatory in a suitcase the amateur's favorite for studying the surface features of Mars, the subdivided rings of Saturn, the ever-changing belt structure of Jupiter, the intricate filamentary detail of deep-sky nebulae, the central regions of globular clusters at up to 500X. Also the ultimate terrestrial telescope or telephoto! (Size swung down: 9″ x 12″ x 22″, Wt.: 23 lbs., $845)



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Museum of Natural History
"Lincoln Fox Bronzes" is an exhibition of this artist's works ranging from large sculptures to small fetishes. Among the pieces are "The Temptation," depicting an evil bird perched on the shoulder of a shaman, and "Snow Hunt," a North Plains buffalo hunting scene. The exhibition is in the second-floor rotunda gallery —opens September 2.

Museum of History and Technology
"American Banking" is a new exhibition documenting the history of banking, from Colonial times to the present. This Bicentennial exhibition opens to the public September 18.

The new "Discovery Corner" offers the opportunity to handle objects such as clothing, munitions and equipment that are normally kept behind glass. Visitors are better able to imagine what it was like to be a soldier in the American Revolution by actually handling some of the objects from that period.

Group Tours
To arrange special group tours of exhibitions, Associates should call the following numbers (all in area code 202): National Portrait Gallery 381-6347; Museum of History and Technology 381-5030; Hirshhorn Museum and Sculpture Garden 381-6713; Museum of Natural History 381-6135; National Collection of Fine Arts and Renwick Gallery 381-6541.

Smithsonian Commons now open on weekends

As a result of its overwhelming popularity, the Smithsonian Commons is now open on weekends for Associates and their families. Located in the original Castle building, the Commons offers a buffet luncheon entrée for a fixed price of $3.25, with a reduced rate for children. Beverages and desserts are optional. The Reception Center and dining area provide a place for Associates to obtain information and lunch in a relaxed setting while visiting the national museum on the Mall. Hours are 11:15 A.M. to 2:15 P.M. seven days a week. An Associates' card is required.

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3. **"The Dye Is Now Cast."** A dramatic two-year prelude to America's declaration of independence. By Lillian B. Miller. 328 p., 166 illus. $17.50

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5. **The Horse in Blackfoot Indian Culture.** A landmark study of the lives of the nomadic Indian hunters of the western plains. By John C. Ewers. 358 p., 49 illus. $12.50

6. **A Standard of Excellence: Andrew W. Mellon Founds the National Gallery of Art at Washington, D.C.** By David Edward Finley. 193 p., 45 illus. $7.50

7. **The Indians of Texas in 1830.** An exceptionally valuable eyewitness record of Indian life now available for the first time in English. By Jean Louis Berlandier; ed., John C. Ewers; trans., Patricia Reading Leclercq. 209 p., 59 illus. (20 in color) $10.00

8. **Eighteenth Century Gunfounding.** How two Dutch master founders influenced British ordnance—and the early Industrial Revolution. By Melvin Jackson and Charles deBeer. 183 p., 65 illus. $15.00

9. **English Yellow-Glazed Earthenware.** The first major study of this distinctive category of English ceramics. By J. Jefferson Miller II. 125 p., 138 illus. (64 in color) $20.00

10. **The Nature of Scientific Discovery.** Proceedings of the Smithsonian's 1973 "Copernicus Symposium" in tribute to the man whose birth heralded a 500-year Age of Discovery. Ed. by Owen Gingerich. 616 p., 110 illus. $15.00

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Travel Benefits for Smithsonian Associates

The Smithsonian Institution continues to offer a varied travel program to meet the needs of its membership. Foreign Study Tours provide culturally oriented, first-class, specialized trips led by museum curators or experts in related fields. Domestic Study Tours offer similar opportunities within the United States, thus allowing Associates and their families a chance to combine vacation with study. (Occasionally, for administrative reasons, Domestic Study Tours sponsor a trip abroad or Foreign Study Tours offer a trip within the United States; these are indicated by *.) Foreign Charter Tours are larger, lower-cost and more general in nature. Travel benefits are announced exclusively in SMITHSONIAN.

Domestic Study Tours

Puerto Rico Botany Study—November 3-13: Tropical forests, giant ferns and orchids; meetings with University of Puerto Rico faculty, U.S. Forest and Park Service officials. **Charlottesville and Tidewater Homes**—November 6-10: Jeffersonian architecture at the University of Virginia and Monticello; historic Richmond and fine examples of James River plantations • **Weekend at the Hirshhorn Museum and Sculpture Garden**—November 14-16: A comprehensive study of contemporary sculpture and paintings in the Hirshhorn collection • **Christmas at the Smithsonian**—December 12-14: Fourth annual Christmas weekend includes an old-fashioned tree-trimming party in the Castle; special tours feature the Bicentennial exhibits • Coming in January: A **Weekend at the National Collection of Fine Arts** • **Washington "Anytime" Weekend:** Choose any weekend to visit the nation's capital and enjoy a special tour of the original Smithsonian building, two nights at the elegant Loew's L'Enfant Plaza Hotel, close by, and a chance to see other sights in Washington by Tourmobile (all-inclusive price is $59.95 per person based on double occupancy) • Write Smithsonian Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 for reservations at least 30 days prior to departure date or call (202) 381-5910 for information.

Foreign Charter Tours

Low-cost cultural and educational tours are currently being planned for 1976 (open only to Associates who have been members for at least six months). Future trips include **Mexico City and Yucatan** in March • **Australia** in March • **Soviet Central Asia** in May • **Russia** in May • **Eastern Europe** in May • **Great Britain** in September • Foreign Charter tours are heavily subscribed, so write early for reservations and additional details concerning a specific trip to Smithsonian Associates Travel Program, A & I 1270B, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5910 for information.

Foreign Study Tours

Russia—September 21-October 5 and September 23-October 7: Art and architecture (waiting list closed) • **Hawaiian Islands***—November 8-21: Petroglyphs and natural history • **South India and Sri Lanka** (Ceylon)—January 12-February 3: Caves, natural history and palaces • **South American Discoveries Voyage**—February 6-March 1: A cruise on the *Apollo*, with an emphasis on natural history. Beginning at Valparaiso, sail through spectacular fjords of Chilean archipelago, following routes of Magellan, Drake and Darwin around Tierra del Fuego and Cape Horn, calling on shores of Patagonia, northern Argentina, Uruguay and Brazil, ending up in Rio at Carnival time • **Sites of Ancient Civilization**—April 2-25: The third cruise aboard the yacht *Argonaut* is between ports of Rome and Athens in the eastern Mediterranean. Under the leadership of distinguished scholars, the voyage is now expanded to include the ceremonies in Greece during Holy Week and an extended stay in Egypt • **Sicily and Southern Italy**—June 6-28 • Write Miss Bliss Schumann, Foreign Study Tours, SI 123, Smithsonian Institution, Washington, D.C. 20560, or call (202) 381-5520 for information.

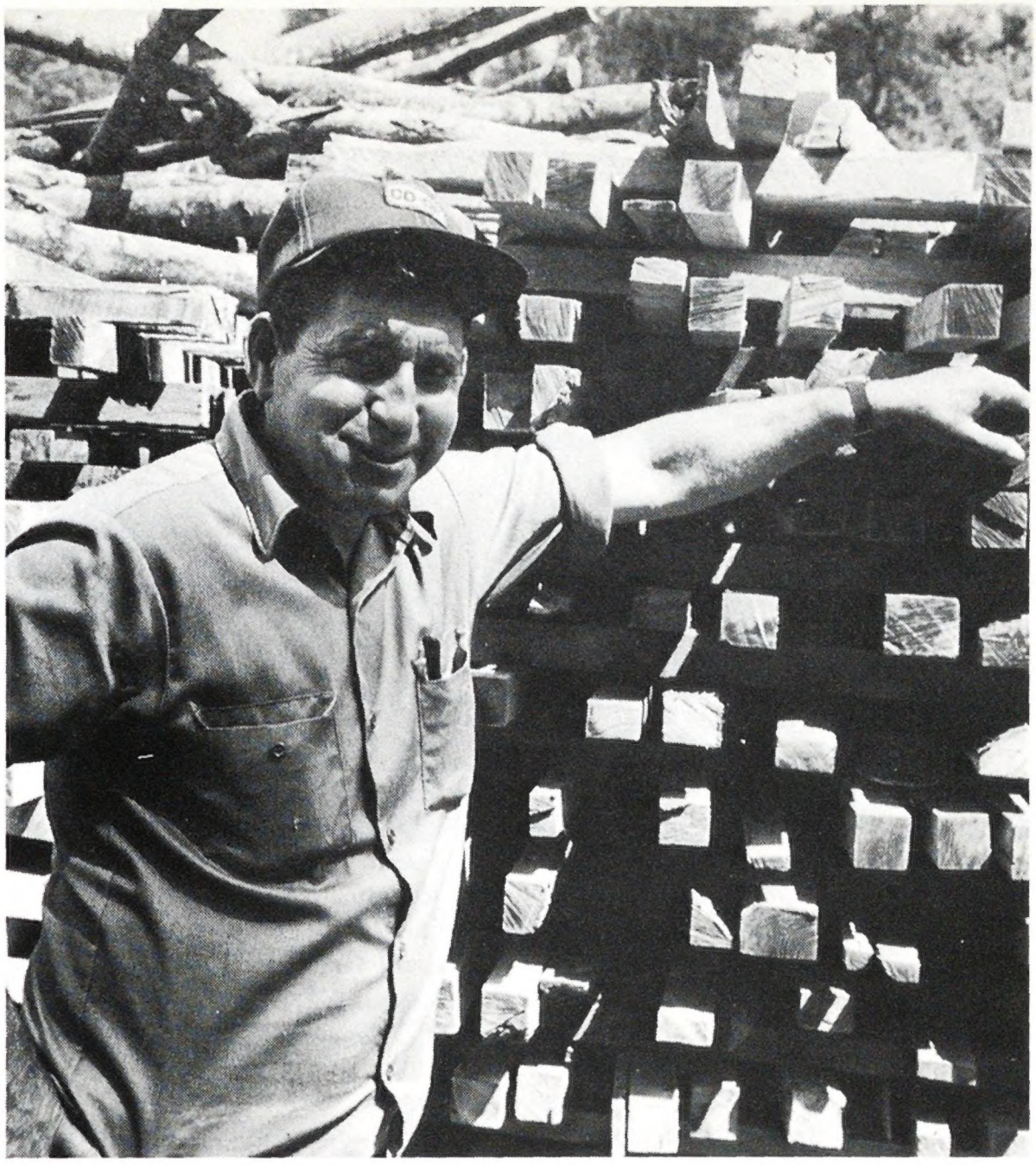
Traveling Exhibition Service

During the last year, more than 4,000,000 people in 45 states throughout the country have visited exhibitions circulated by the Smithsonian Institution Traveling Exhibition Service. Currently, there are numerous photography exhibitions on view documenting social history, environmental concerns and daily life in the United States. For information on bringing an exhibition to your community, write: Smithsonian Institution Traveling Exhibition Service, Washington, D.C. 20560 or call (202) 381-6631.

- Boulder, Colorado—"An American Exodus" (photographs by Dorothea Lange chronicling the lives of migrant farmers), U.M.C. Gallery at the University of Colorado, September 27-October 26.
- Raleigh, North Carolina—"Janss Underwater Photography (color photographs of marine life by Edwin Janss jr.), North Carolina State University, September 20-October 19.
- Fresno, California—"The Hand of Man on America" (sensitive photographs by David Plowden showing Man's impact on the natural environment), Fresno District Fair, September 20-October 12.
- Houghton, Michigan—"Our Only World" (photo essay of environmental problems facing each citizen today, produced by the Environmental Protection Agency's Documerica Program), Michigan Technical University, September 20-October 19.
- Norwich, Connecticut—"Next Door, Down the Road, Around the Corner" (a family album about Americans and how we live, photographed by Richard Blazer during an extensive trip throughout the United States in 1970), The Slater Memorial Museum, September 27-October 26.
- Shreveport, Louisiana—"The Magnificent West" (the beauty and majesty of Yosemite, Grand Canyon and the Tetons, photographed by Milton Goldstein), Louisiana Bank and Trust Co., September 13-October 12.

Fall Museum Hours

The Arts and Industries Building, home of the *Spirit of St. Louis*, the "moon rock" and the Apollo 11 command module is closed for Bicentennial renovation. After Labor Day, the other Smithsonian museum buildings are open daily from 10 A.M. to 5:30 P.M. The National Zoological Park is open daily from 9 A.M. to 6 P.M. through September.



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By H. Allen Smith

There may be flea circuses —but in Monahans?

Impulsively, I turned off Interstate 20 where the sign said Monahans. I remembered reading in two or three books that this West Texas town was the world's capital for performing fleas. It is surrounded by white sand dunes, where flea talent scouts were said to conduct their safaris.

I said to the lady at the chamber of commerce: "The books say that proprietors of flea circuses from all over the world come here to recruit their performers, because Monahans fleas are the strongest and most agile and most *intelligent* fleas on earth." The lady said, "I declare. This is the first I ever heard of such a thing." She said there was one man in Monahans who might fill me in—an old-timer down at the paper. She got him on the phone, telling him that there was a writer fellow in her office talking about Monahans fleas.

The old-timer sputtered, "My God, have they drug that oldie out of the woodwork again?" He said that many years ago a flab-noggin from one of the New York papers paused in Monahans for nine seconds, drank half a bottle of whiskey, then sent back a story about the high-leaping fleas in the dunes. Not a word of truth in it.

I went back to Monahans twice and sought out local historians. No one had ever heard of any fleas. One citizen openly tried to tout me off fleas by telling me that Monahans had produced a president of Standard Oil of New Jersey. A lady librarian said that if I were a writer I ought to forget about fleas and do a glowing article about the high school band, which she described as the town's pride and joy.

Back home I ran into a young couple, the Larikings, who have kinfolk in Monahans and visit them from time to time. They have a little dog. "We don't take him to Monahans any more," said Mrs. Lariking. "We used to, but afterward it would take us a week to get the fleas off."

"Big as grasshoppers," said Lariking.

I arrived at a judgment: There are a lot of fleas in and around the town, but the proud people of Monahans do not want the flea set up as a symbol of their community. There are people who find pleasant things to say about the man-eating shark. The vermiform appendix has its stout defenders. The Great Plague of London was pure catastrophe, yet there were those who said it had good points. Now I was finding an almost universal hatred for the flea.

I set out to find something favorable in his behalf. I prowled the nearby university library. I found whole books about fleas, but not one of them had a good word to say about the lorn little creatures. Smartest of all the flea men seem to have been Henry Ellsworth Ewing and Irving Fox. Their book, *The Fleas of North America,* is no more than a listing of some 200 genera, subgenera, species and subspecies. The worst favor the authors do the flea is to reproduce an enlarged drawing of the insect's head; it is enough to turn a man against all nature.

In all flea literature I found few statements remotely favorable to the flea. Mark Twain wrote that "fleas can be taught nearly everything that a congressman can." It may have been he, too, who said that Lord Nelson "would have been afraid of ten thousand fleas, but a flea wouldn't have been afraid of ten thousand Nelsons."

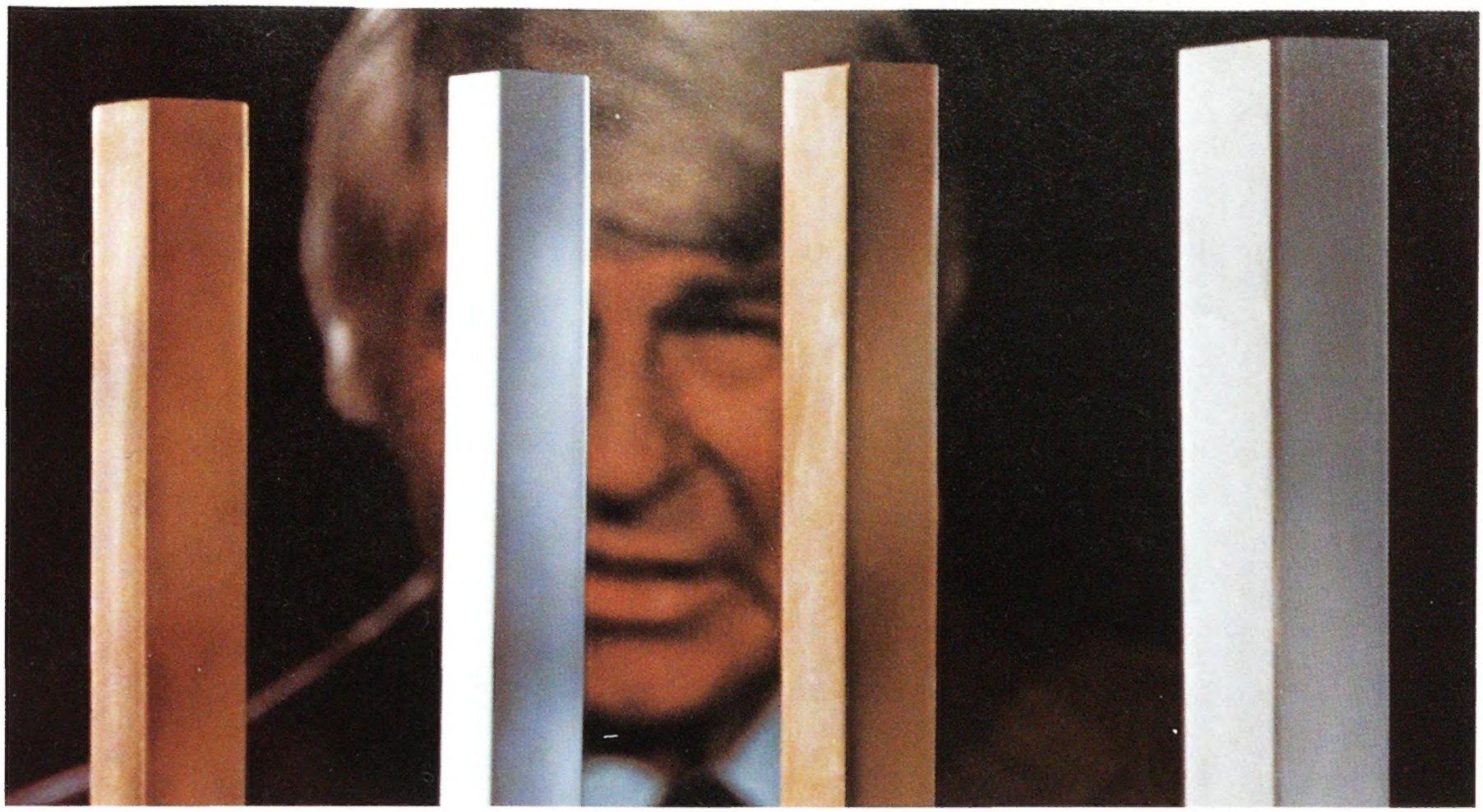
This sounds like the defiant swagger of "the merry flea" in *archy and mehitabel,* which "marched/bravely into the zoo/ and bit a lion what did he do i asked/he lay there and took it said/ the flea what else could he do. . . ." *

Passing Monahans at a later date, I visited a roadside museum amidst the sand dunes. They had a stuffed javelina, a badger, a coyote, a coatimundi, a prairie chicken—and in a glass case with a termite, a horned frog, a wolf spider and squash bugs, there was a single flea, so tiny that I almost needed a magnifying glass to even see him. I asked the lady in charge of the museum about it and she said she had never even noticed it, didn't even know it was there. Nor had she ever seen a single flea in the dunes.

Somehow I got discouraged. I could find no friend of the flea. I'm giving up the trade of investigative reporter and going into some other line of work. I did learn one lovely word describing a person who is an authority on fleas, and I have, by a fluke, become one. I would be willing to accept a job as staff siphonapterologist on this magazine.

Meanwhile, I apologize to the good people of Monahans, and happily salute their high school band.

* From *the lives and times of archy & mehitabel* by Don Marquis, copyright 1927 by Doubleday & Company, Inc., used by permission of the publisher.



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The four metal bars seen above were sized to conduct the same amounts of electricity. Yet, the gold bar costs about $11,000, the silver about $110, the copper about 90 cents. The aluminum bar costs only 30 cents.*

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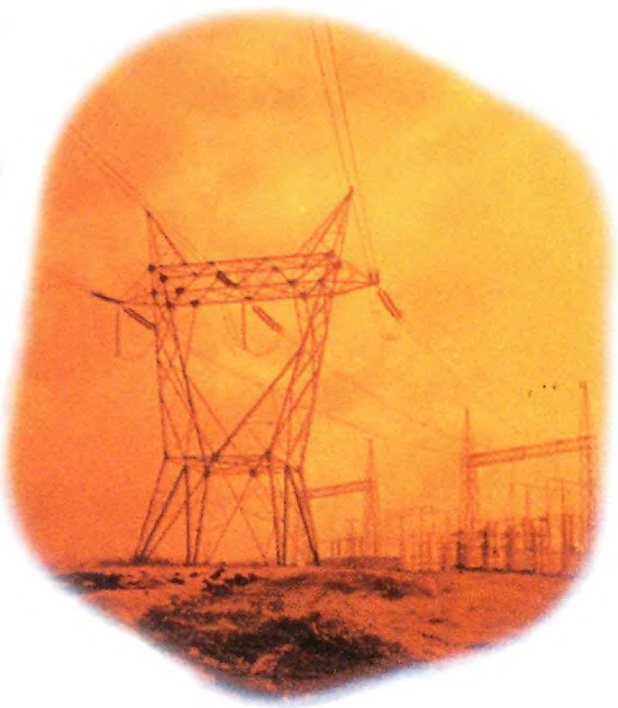

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